September 11, 1989 • Section 2 of 2

COMPUTERWORLD

The Most Effective Users of Information Systems

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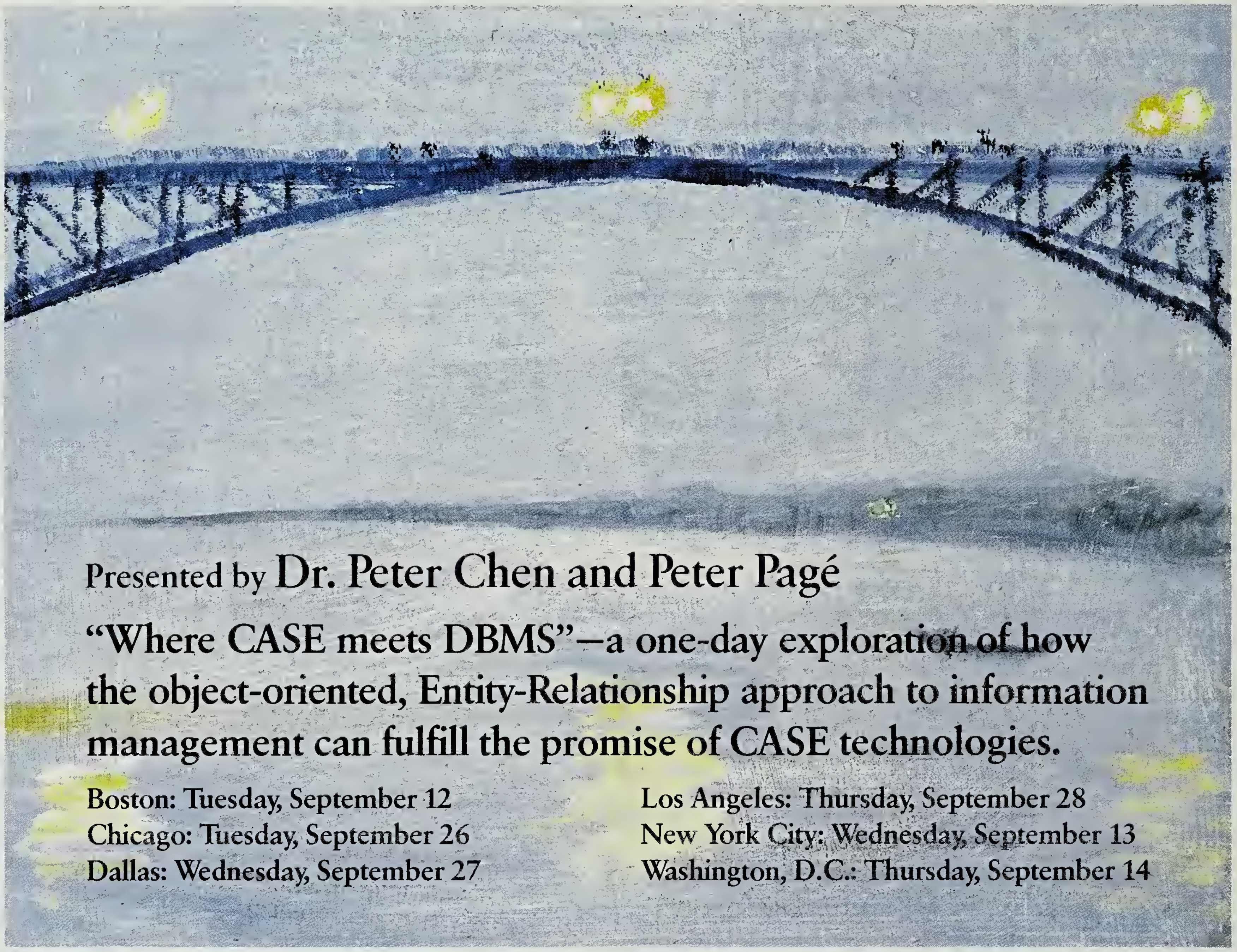

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1: IBM Journal of SAA 2: DATAPRO survey, August 1988, companies with sales over $10 million 3: Donaldson, Lufkin & Jenrette report

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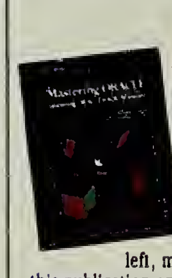

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EDITOR'S NOTE

The Computerworld Premier 100 Team

Bill O'Connell

Ever since *Fortune* magazine unveiled its 500 list 34 years ago, the world of business has been inundated with rankings of nearly every conceivable nature. The allure of these lists is their promise to fill our seemingly insatiable need to find our position among our peers: Where, we all want to know, do we stand?

Until now, information systems has had no useful or valid list with which to measure itself as a discipline. While managers search for ways to prove the value of technology, finding a way to measure that value has proved especially difficult. Looking at budget or systems value alone reveals who the big spenders are — not the most successful users. That's hardly an argument to impress the CEO.

We need more definitive measures, which is the reason for the *Computerworld Premier 100* list. We rank the most effective IS users not by how much they spend but by how they rate according to six carefully selected and researched criteria.

After our first ranking appeared last year, many IS managers used these measures to bolster their budget presentations to upper management. They drew on the *Premier 100's* industry comparisons — this year expanded to 13 categories — to show the value of their work.

We offer not only the numbers on the charts but also revealing profiles of the leading IS users in each industry. How do these top-rated users apply technology to meet demands? How do they translate a position on the list into competitive advantage for their companies? The data on each company's IS operation, combined with the insights of these industry-leading IS managers, provides a concise yardstick and a path to follow for success.

In short, the *Computerworld Premier 100* presents a snapshot of the 1989 IS world and reflects the volatility of corporations and their IS strategies.

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Leaders Go Beyond Basics, Link IS to Business Strategy

By Michael L. Sullivan-Trainor

Beata Szpura

In a world where nearly everyone knows how to apply technology, gaining a competitive advantage with information systems is no longer enough to guarantee long-term success. In fact, arming the corporate arsenal with IS resources that support revenue-producing programs is a matter of survival.

For this reason, the most effective users of IS in 1989 — as reflected by the companies in this year's *Computerworld Premier 100* — are not companies that merely grasp the idea that technology is vital. They are the companies that know how to closely integrate IS with business strategy and culture.

Many of these companies shifted position in the 100 list between 1988 and '89, reflecting overall changes in the corporate business climate and the volatility of key information systems factors. These include total IS spending compared with competitors, the market value of installed systems, increases or decreases in staff and training investments and the total distribution of personal computers and terminals throughout the corporation.

MCI, this year's No. 1 company, reflects many of the trends found throughout the 1989 *Premier 100.* With significant increases in both revenue and profits, the company continues to gain ground on archrival AT&T. One of the major reasons for this success is a savvy marketing strategy that is reliant on IS, particularly expert systems used for sales prospecting.

The long-distance carrier's IS was bolstered by a 27% budget increase — $61 million over last year — and a 44% increase in installed value — $54 million over last year. MCI's efforts to distribute technology access to the work force include 26,500 PCs and terminals — more than one for each employee.

Bankers Trust, which showed the largest profit increase of any Fortune 500 service company in 1988, also focuses on distributing technology to its work force. However, its key to success is profit center-oriented business management matched by a decentralized IS structure.

Bankers Trust is the first bank to have implemented such a strategy, and its decentralization provides flexibility to meet changing business conditions.

Another challenge facing *Premier 100* companies is the need to extend their competitive advantage. For example, both AMR and Baxter Healthcare must provide new systems capabilities for their well-established competitive systems to sustain their own growth and stay ahead of the pack.

AMR, parent company of American Airlines, adds value to its information systems by creating new IS businesses such as selling information services to other airlines and hotel and car-rental companies. Max D. Hopper, an AMR senior vice-president, not only maintains his leadership over IS areas but manages corporate direction as well.

Baxter's approach is different. Rather than turning to other companies as customers for IS services, the health-care products manufacturer and distributor looks internally to further distribute and migrate technology. The company emphasizes reducing product costs and lead times by moving IS closer to the business areas responsible for those functions.

For example, Baxter increased its terminals and personal computers by 44% this year to further that goal.

Other companies are succeeding despite being swept up in takeover battles or mergers. Often these management struggles lead to a trimming of the fat and more cost-effective use of IS.

For example, a leveraged buyout cut Union Texas Petroleum free of a large conglomerate and allowed the company to focus IS initiatives more closely on business needs.

Gillette went through similar turmoil, emerging victoriously after two hostile takeover attempts. The result for IS is a new set of projects aimed at key company goals.

A company's ability to focus on what it needs to accomplish on the business side can determine the effectiveness of IS.

For example, Timken's dedication to a single line of steel products allows the company to implement computer-integrated manufacturing systems that produce higher quality products more quickly than the competition. The result has been Timken's continued success in taking business away from Japanese competitors both here and in Japan.

The ways in which companies succeed as users of IS vary as widely as the strategies revealed in the following pages. Despite these different approaches, however, it is clear that the mandate for the 1990s is to integrate IS more closely with the business and provide all the flexibility and diverse resources that linkage implies.

How We Rank the 100

IS effectiveness is determined by how well a company executes its technology plans against competitors; how current it keeps its arsenal of equipment; to what extent it trains and manages the IS staff; and to what extent employees have access to technology. These factors, along with long-term profitability, indicate how effectively IS is used within a given corporation.

Each year, the *Computerworld Premier 100* ranks companies on how well they perform in these areas in relation to their peers.

Annual IS budget as a percentage of revenue, the first criterion, is not evaluated alone. It is compared with industry averages from a survey of Fortune 1,000 companies. The difference between the company and industry ratios is ranked, and the score is weighted by a factor of 30.

The second criterion, the market value of systems as a percentage of total revenue, reveals the currentness of equipment and is weighted by a factor of 15.

The third criterion, five-year company profitability, recognizes the relationship of IS and business performance. This is weighted by a factor of 15.

Managing staff costs is vital in this age of corporate takeovers and mergers. The staff spending criterion awards more points for lower staff costs and weights the result by a factor of 10.

IS managers must advocate for training to keep their staffs up to date. The training criterion measures the amount of IS budget devoted to that area, weighting it by a factor of 15.

The requirement to provide user access to technology is measured as the ratio of PCs and terminals to total employees, weighted by a factor of 15.

Top Companies Shift Tactics

In their quest to marry IS strategy to their company's business goals, the *Premier 100* companies are changing the ways they invest in and distribute technology. They are also focusing on new system development and changing the areas of concentration of their staffs. Survey results from these firms reveal the following trends:

- Booming 1988 profits were matched by a strong commitment to IS in the form of a 13% overall increase in 1989 spending. IS budgets increased from $26 billion to $30 billion for firms that were scored in the second annual *Premier 100* ranking. Each firm increased its budget an average of slightly more than 9% from 1988.

- The companies are shifting a portion of their IS investments from large-processor applications to ones running over networked personal computers. Of these firms, 83% say they are moving applications to PC networks, with an average of 10 major applications being downsized at each company.

- The applications development staff — the focal point for creating competitive advantage — reaped the benefits of the cutbacks in other areas, with 59% of the companies reporting increases in that area. While spending on staff increased by only 0.5%, 50% of the companies reported cutbacks in operations personnel. Data communications also received a boost, with 17% of the companies adding staff to handle increased network support.

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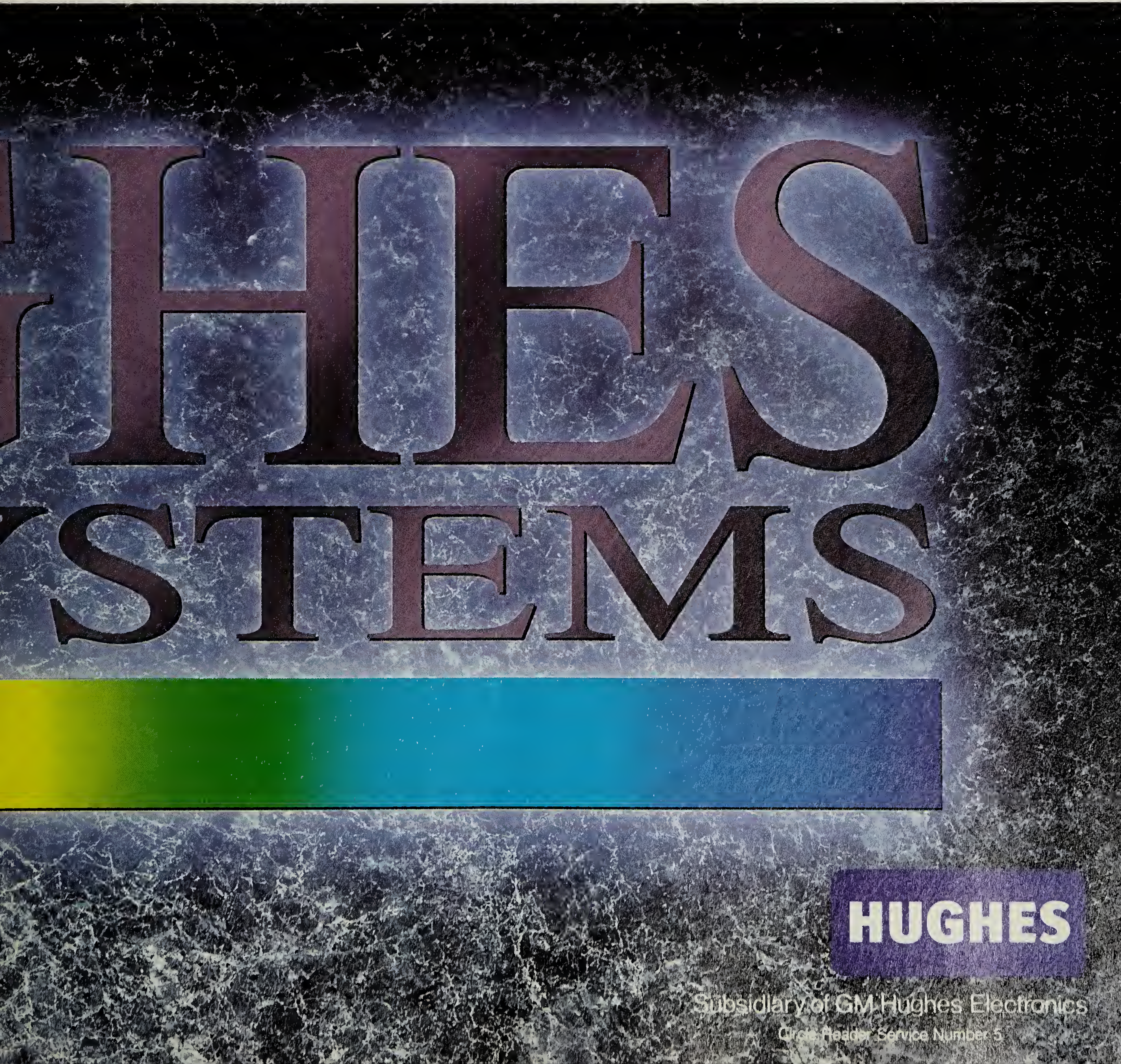
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The 100 Most Effective Users of Information Systems

Overall rank	**Company** IS executive	Industry	Industry rank	Total score
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2	**GTE Corp.** Dennis J. Murphy, Director	Utilities	2	29,295
3	**AMR Corp.** Max D. Hopper, Senior VP	Transportation	1	29,020
4	**Bankers Trust** Carmine Vona, Executive VP	Banking	1	28,740
5	**Banc One Corp.** Dave Van Lear, President, Services Corp.	Banking	2	28,501
6	**General Dynamics Corp.** Ken Wang, Director	Aerospace	1	28,500
7	**Security Pacific Corp.** John Singleton, President, Automation Co.	Banking	3	28,220
8	**Baxter Healthcare Corp.** Michael S. Heschel, Corp. VP	Equipment & Materials Manufacturing	1	28,075
9	**Contel Corp.*** Ken Bottonari, VP	Utilities	3	28,030
10	**Gillette Co.** Herbert W. Moller, VP	Consumer Products	1	27,925
11	**American President Cos. Ltd.** James Marston, Senior VP	Transportation	2	27,820
12	**Northrop Corp.** W. Richard Howard, VP	Aerospace	2	27,740
13	**Gencorp, Inc.*** Linda George, Director	Aerospace	3	27,605
14	**Bell Atlantic Corp.** Joe Ambrozy, VP	Utilities	4	27,565
15	**Norwest Corp.** John Geiken, Group Head	Banking	4	27,450
16	**Dow Chemical Co.** Hans Huppertz, VP	Chemicals	1	27,225
17	**Timken Co.*** Peter Kost, Director	Industrial & Automotive Products	1	27,120
18	**Lockheed Corp.** Dean Allen, Director	Aerospace	4	26,985
19	**Union Texas Petroleum Corp.** Richard L. White, Director	Petroleum	1	26,905
20	**Grumman Corp.** J. Thomas Kelly, Director	Aerospace	5	26,880
21	**Southwestern Bell Corp.** Kenneth Bender, VP	Utilities	5	26,850
22	**Abbott Laboratories*** Kenneth Farmer, VP	Pharmaceuticals & Food	1	26,795
23	**AT&T*** William Garrett, VP	Utilities	6	26,720
24	**3M Co.** Donald Siegfried, Executive Director	Equipment & Materials Manufacturing	2	26,645
25	**American Express Co.** Garland Cupp, Executive VP, TRS	Financial Services & Insurance	1	26,610

* Estimates are from *Computerworld* sources, not the company

Estimated IS budget (millions)	IS budget as % of revenue	Estimated IS value (millions)	IS value as % of revenue	% of IS budget for staff	% of IS budget for training	Total PCs and terminals	PCs/terminals as % of employees
$285	5.55%	$177	3.45%	43%	6%	26,500	166.67%
$750	4.56%	$200	1.22%	37%	5%	76,000	47.50%
$1,225	13.88%	$78	0.88%	19%	2%	112,615	165.85%
$370	6.32%	$70	1.20%	40%	1%	7,800	62.40%
$170	6.22%	$60	2.19%	36%	5%	10,000	59.17%
$550	5.76%	$250	2.62%	40%	2%	27,000	25.94%
$440	5.19%	$150	1.77%	49%	1%	29,500	70.41%
$250	3.64%	$60	0.87%	30%	6%	36,000	57.32%
$150	5.06%	$50	1.69%	38%	5%	5,000	22.52%
$96	2.68%	$80	2.23%	50%	5%	7,540	25.22%
$110	5.18%	$20	0.94%	26%	1%	3,400	80.95%
$380	6.56%	$125	2.16%	55%	5%	21,800	46.98%
$40	2.12%	$15	0.79%	35%	5%	5,879	39.46%
$635	5.84%	$385	3.54%	40%	3%	53,000	65.43%
$110	4.44%	$42	1.70%	40%	3%	14,500	92.95%
$315	1.89%	$80	0.48%	32%	5%	28,000	51.57%
$35	2.24%	$18	1.14%	40%	5%	11,640	66.90%
$450	4.25%	$200	1.89%	38%	3%	39,000	41.89%
$16	1.44%	$19	1.72%	46%	1%	1,600	88.89%
$253	7.05%	$72	1.99%	46%	2%	14,844	45.12%
$366	4.33%	$249	2.95%	36%	1%	55,850	84.62%
$125	2.53%	$125	2.53%	35%	5%	14,000	36.55%
$600	1.70%	$600	1.70%	36%	5%	89,000	29.31%
$517	4.89%	$160	1.51%	48%	7%	41,500	50.18%
$1,000	4.36%	$400	1.74%	23%	5%	72,000	78.09%

The 100 Most Effective Users of Information Systems

Overall rank	**Company** IS executive	Industry	Industry rank	Total score
26	**Sara Lee Corp.** Vincent H. Swoyer, VP	Pharmaceuticals & Food	2	26,535
27	**Farmers Group, Inc.** Edward A. Terhar, VP	Financial Services & Insurance	2	26,410
28	**Northeast Utilities** Tod O. Dixon, VP	Utilities	7	26,405
29	**McDonnell Douglas Corp.** Ernie Ridenhour, VP	Aerospace	6	26,325
30	**US West** Andrew T. Eiseman, Manager	Utilities	8	26,300
31	**Polaroid Corp.** Al Hyland, Director	Consumer Products	2	26,285
32	**Monsanto Co.** Leonard A. Cohn, VP	Chemicals	2	26,275
33	**Atlantic Richfield Co.** John F. Coman, Manager	Petroleum	2	26,195
34	**United Technologies Corp.** John Hammitt, VP	Aerospace	7	26,135
35	**Nationwide Mutual Ins. Co.*** D. M. Fullerton, VP	Financial Services & Insurance	3	26,045
36	**McGraw-Hill, Inc.*** Richard Shriver, Senior VP	Consumer Products	3	25,995
37	**Macmillan Publishing Co.** John Leo, President	Consumer Products	4	25,870
38	**Textron, Inc.** Cecil Labhart, VP	Aerospace	8	25,865
39	**Sovran Financial Corp.** Terry L. Eikenbery, Exec. Officer	Banking	5	25,820
40	**Great Northern Nekoosa*** John Caccagnino, Director	Equipment & Materials Manufacturing	3	25,745
41	**Sipco, Inc.*** James D. Fortier, Director	Pharmaceuticals & Food	3	25,705
42	**Rockwell International Corp.** James Sutter, VP	Aerospace	9	25,650
43	**RJR Nabisco, Inc.*** Tom Zoeller, Staff VP	Pharmaceuticals & Food	4	25,636
44	**Dun & Bradstreet Corp.** Michael Field, Executive VP	Diversified Services	1	25,635
45	**Valley National Corp.** Richard Picard, Senior VP	Banking	6	25,570
46	**Federal Express Corp.** Ron J. Ponder, Senior VP	Transportation	3	25,540
47	**Northwestern Mutual Life*** Edward A. Flitz, VP	Financial Services & Insurance	4	25,535
48	**Paine Webber Group, Inc.** Donald B. Marron, President	Financial Services & Insurance	5	25,520
49	**Unocal Corp.** Gordon Dolfie, Director	Petroleum	3	25,440
50	**Johnson & Johnson*** Raymond Giovannelli, VP	Pharmaceuticals & Food	5	25,395

* Estimates are from *Computerworld* sources, not the company

Estimated IS budget (millions)	IS budget as % of revenue	Estimated IS value (millions)	IS value as % of revenue	% of IS budget for staff	% of IS budget for training	Total PCs and terminals	PCs/terminals as % of employees
$242	2.16%	$26	0.23%	27%	6%	85,000	95.40%
$53	4.43%	$13	1.10%	70%	14%	15,875	102.37%
$71	3.43%	$114	5.47%	39%	6%	4,645	50.49%
$786	5.21%	$171	1.13%	36%	5%	60,000	51.33%
$250	2.71%	$275	2.98%	52%	2%	82,713	119.70%
$61	3.27%	$30	1.61%	44%	1%	4,800	39.02%
$168	2.03%	$135	1.63%	30%	2%	12,000	25.16%
$257	1.46%	$40	0.23%	48%	2%	16,000	60.38%
$814	4.50%	$217	1.20%	47%	0.3%	32,100	17.04%
$130	6.25%	$69	3.30%	70%	5%	5,000	67.87%
$125	6.88%	$125	6.88%	40%	3%	4,273	26.54%
$90	8.83%	$35	3.43%	65%	12%	3,500	37.23%
$235	3.23%	$60	0.82%	41%	1%	21,000	34.71%
$110	4.93%	$32	1.42%	35%	5%	4,000	27.78%
$43	1.20%	$43	1.20%	40%	2%	11,266	57.48%
$31	0.97%	$42	1.31%	41%	3%	1,948	36.06%
$440	3.63%	$165	1.36%	32%	4%	34,800	30.47%
$240	1.42%	$60	0.35%	45%	5%	50,000	42.78%
$200	4.69%	$130	3.04%	45%	5%	20,900	31.91%
$53	4.62%	$10	0.87%	40%	1%	8,422	110.82%
$200	4.71%	$66	1.56%	47%	2%	10,000	20.58%
$135	2.52%	$54	1.01%	46%	2%	6,645	76.84%
$190	7.56%	$12	0.48%	48%	2%	2,200	16.92%
$142	1.61%	$78	0.88%	36%	1%	8,600	47.25%
$200	2.22%	$60	0.67%	45%	5%	20,000	25.06%

The 100 Most Effective Users of Information Systems

Overall rank	Company IS executive	Industry	Industry rank	Total score
51	**Kemper Corp.*** Robert Tarjan, Senior VP	Financial Services & Insurance	6	25,350
52	**Berkshire Hathaway, Inc.*** Tom Trotter, Director	Consumer Products	5	25,305
53	**Nortek, Inc.*** Regina Winkfield, Administrator	Equipment & Materials Manufacturing	4	25,205
54	**Becton Dickinson & Co.*** Hank Willen, Corporate Director	Equipment & Materials Manufacturing	5	25,175
55	**J.C. Penney Co.** Dave Evans, VP	Retailing	1	25,155
56	**Ingersoll-Rand Co.** Bob Morris, Group Manager	Industrial & Automotive Products	2	25,145
57	**Merck & Co.*** Albert Cinorre, VP	Pharmaceuticals & Food	6	25,125
58	**The Mead Corp.*** John Langenbahn, VP	Equipment & Materials Manufacturing	6	25,120
59	**Temple-Inland, Inc.*** Dennis Caldwell, Director	Equipment & Materials Manufacturing	7	25,100
60	**Mobil Corp.** Bill Halpern, Manager	Petroleum	4	25,030
61	**Amoco Corp.** John R. Reid, General Manager	Petroleum	5	24,990
62	**North Amer. Philips Corp.*** Einar Kloster, President	Equipment & Materials Manufacturing	8	24,966
63	**Owens-Corning** William Boeschenstein, President	Equipment & Materials Manufacturing	9	24,965
64	**Burlington Holdings, Inc.** E. Ritchie Fishburne, Director	Equipment & Materials Manufacturing	10	24,890
65	**Masco Corp.*** Thomas Roy, Director	Consumer Products	6	24,875
66	**Lafarge Corp.*** Ken Hill, Manager	Equipment & Materials Manufacturing	11	24,830
67	**The Boeing Co.** Mike Hallman, President, Computer Services	Aerospace	10	24,820
68	**J.P. Morgan & Co.*** Ralph Mastrangelo, Senior VP	Banking	7	24,810
69	**Caterpillar, Inc.** Dale L. Fieldcamp, Manager	Industrial & Automotive Products	3	24,795
70	**Borg-Warner Corp.*** Steve Derry, Director	Industrial & Automotive Products	4	24,760
71	**Shawmut National Corp.** William C. Schrader, Senior VP	Banking	8	24,725
72	**Dover Corp.*** Marty McGowan, Manager	Industrial & Automotive Products	5	24,710
73	**The Goodyear Tire & Rubber Co.*** Jim Evans, Manager	Equipment & Materials Manufacturing	12	24,675
74	**Signet Banking Corp.*** Floyd Griggs, Senior VP	Banking	9	24,670
75	**Black & Decker Corp.** Sid Diamond, VP	Industrial & Automotive Products	6	24,590

* Estimates are from *Computerworld* sources, not the company

Estimated IS budget (millions)	IS budget as % of revenue	Estimated IS value (millions)	IS value as % of revenue	% of IS budget for staff	% of IS budget for training	Total PCs and terminals	PCs/terminals as % of employees
$107	3.42%	$60	1.91%	43%	4%	4,063	24.48%
$50	2.14%	$22	0.93%	45%	5%	5,960	29.80%
$17	1.20%	$17	1.20%	40%	2%	6,122	57.48%
$34	1.96%	$21	1.20%	35%	5%	9,102	44.84%
$220	1.44%	$113	0.74%	34%	5%	83,000	44.74%
$60	1.99%	$34	1.14%	35%	5%	18,000	60.20%
$150	2.53%	$100	1.68%	40%	3%	5,000	15.82%
$50	1.12%	$130	2.91%	60%	5%	5,000	24.04%
$25	1.20%	$25	1.20%	43%	7%	6,322	57.48%
$670	1.39%	$180	0.37%	30%	2%	36,600	53.12%
$250	1.18%	$135	0.64%	40%	5%	25,000	49.90%
$116	2.14%	$60	1.11%	41%	3%	14,412	28.54%
$43	1.53%	$8	0.29%	38%	4%	4,165	23.66%
$35	1.60%	$2	0.10%	49%	2%	4,430	63.29%
$29	1.20%	$29	1.20%	40%	2%	15,519	57.48%
$16	1.20%	$16	1.20%	40%	2%	3,851	57.48%
$1,000	5.90%	$100	0.59%	42%	2%	72,500	49.22%
$345	4.40%	$111	1.42%	42%	3%	2,904	18.74%
$200	1.95%	$200	1.95%	40%	5%	12,000	20.69%
$73	2.28%	$40	1.23%	50%	4%	13,822	19.69%
$128	4.56%	$15	0.52%	41%	0.4%	6,000	47.62%
$44	2.24%	$22	1.14%	35%	5%	12,711	66.90%
$140	1.30%	$125	1.16%	43%	5%	22,000	19.26%
$55	4.40%	$18	1.42%	42%	4%	1,105	18.74%
$125	5.27%	$20	0.84%	35%	5%	4,500	22.17%

The 100 Most Effective Users of Information Systems

Overall rank	Company IS executive	Industry	Industry rank	Total score
76	**Bethlehem Steel Corp.** George T. Fugere, VP	Equipment & Materials Manufacturing	13	24,570
77	**Freeport-McMoran, Inc.** Ron Landry, Director	Chemicals	3	24,455
78	**Boise Cascade Corp.** Richard D. Elwood, Director	Equipment & Materials Manufacturing	14	24,450
79	**General Signal Corp.** Stefan Gladyszewski, Director	Equipment & Materials Manufacturing	15	24,435
80	**Warner Communications, Inc.*** Greg Sanchez, Director	Consumer Products	7	24,425
81	**National City Corp.*** Harold B. Todd, Executive VP	Banking	10	24,410
82	**USAir Group*** Bill Ryder, Director	Transportation	4	24,380
83	**Midlantic Banks, Inc.*** Jeff Griffie, Executive VP	Banking	11	24,291
84	**Keycorp** Robert L. Tucker, Site Manager	Banking	12	24,290
85	**U.S. Bancorp** William Ulrich, Director	Banking	13	24,285
86	**Entergy Corp.** Robert Deloach, VP	Utilities	9	24,265
87	**Yellow Freight Systems*** Robert Callahan, VP	Transportation	5	24,240
88	**Schering-Plough Corp.*** Roy Wittman, Director	Pharmaceuticals & Food	7	24,180
89	**Fleet/Norstar Financial*** Michael Zucchini, CIO	Financial Services & Insurance	7	24,155
90	**Corning, Inc.** Harvey Shrednick, VP	Equipment & Materials Manufacturing	16	24,145
91	**Mack Trucks, Inc.** John B. Curcio, VP	Industrial & Automotive Products	7	24,135
92	**Citicorp*** Alan Paderewski, VP	Banking	14	24,105
93	**Martin Marietta Corp.*** James Ritter, Director	Aerospace	11	24,060
94	**Duke Power Co.** George E. Stubbins, VP	Utilities	10	24,005
95	**Du Pont Co.** Raymond E. Cairns, VP	Chemicals	4	23,965
96	**ITT*** Timothy O'Leary, Director	Utilities	11	23,936
97	**Great Western Financial Corp.** Joe Jackson, Senior VP	Banking	15	23,935
98	**NCNB Corp.** Harrison Giles, Executive VP	Banking	16	23,920
99	**First Union Corp.*** Charles Klapheke, VP	Banking	17	23,900
100	**Mellon Bank Corp.** George P. DiNardo, Executive VP	Banking	18	23,825

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Estimated IS budget (millions)	IS budget as % of revenue	Estimated IS value (millions)	IS value as % of revenue	% of IS budget for staff	% of IS budget for training	Total PCs and terminals	PCs/terminals as % of employees
$87	1.58%	$25	0.46%	40%	1%	7,021	21.34%
$28	1.46%	$14	0.73%	35%	5%	1,050	15.67%
$80	1.94%	$13	0.32%	36%	2%	4,500	22.50%
$50	2.84%	$40	2.27%	25%	2%	8,500	44.50%
$90	2.14%	$28	0.67%	43%	5%	3,995	28.54%
$98	4.40%	$32	1.42%	35%	5%	2,642	18.74%
$228	4.00%	$40	0.70%	35%	5%	25,114	53.55%
$81	4.40%	$26	1.42%	35%	5%	1,986	18.74%
$67	4.81%	$8	0.56%	42%	1%	4,738	45.12%
$61	4.40%	$20	1.42%	53%	0.2%	7,500	79.79%
$82	2.29%	$32	0.90%	37%	3%	5,000	37.31%
$81	4.00%	$14	0.70%	45%	5%	14,565	53.55%
$36	1.20%	$81	2.72%	40%	3%	5,856	26.50%
$104	3.42%	$26	0.86%	42%	4%	4,694	24.58%
$30	1.41%	$20	0.94%	46%	3%	6,750	26.06%
$40	1.90%	$26	1.23%	36%	1%	2,500	26.60%
$1,500	4.68%	$400	1.25%	38%	5%	25,000	27.93%
$100	1.75%	$60	1.05%	40%	2%	10,000	14.53%
$68	1.89%	$38	1.05%	35%	3%	7,548	37.55%
$1,000	3.08%	$140	0.43%	42%	4%	30,000	21.35%
$662	3.42%	$166	0.86%	37%	4%	29,008	24.48%
$100	3.16%	$28	0.87%	30%	3%	18,000	148.76%
$106	3.75%	$24	0.85%	33%	2%	10,900	85.83%
$120	4.14%	$14	0.48%	18%	1%	8,000	40.00%
$172	5.26%	$46	1.41%	48%	2%	11,000	66.67%

MCI Wins Marketing Game With 'Expert' IS Strategy

By Amy Bernstein

MCI Communications Corp., the scrappy underdog of telecommunications, is finally operating in the black after nearly 20 years of negative cash flow. In this year's second quarter, the second largest long-distance phone company boosted revenue 31% from the previous year and more than doubled its earnings.

With a reputation on Wall Street as a savvy marketer, MCI can attribute much of its success to its information systems. The company's ability to match technology and business objectives sets it at the top of this year's *Computerworld Premier 100* and as number one in its industry. In the highly competitive telecommunications field, where the big players are leveraging the same technical guns, how a company manages its technology is more important than the specific hardware and software it uses.

Katherine Lambert

MCI's Ditchfield *leads the utilities pack*

"MCI's strength is not technical know-how so much as knowing how to utilize the technology that's available in network design and configuration. They're very good at applying technology," says Joseph Bellace, an analyst at Merrill Lynch Research in New York.

New applications that MCI's IS organization developed recently include expert systems for the sales force and a real-time order entry system for account managers.

The approach is to centralize, refine and localize new systems. First, build on a mainframe and distribute nationally so users can experiment and provide feedback. Next, refine and port them to personal computers and laptops so users can share the same information everywhere. The process takes time, concedes Allan Ditchfield, MCI's senior vice-president of MIS, but it is a good way to validate prototypes and then put truly useful new tools into the field.

One new product is the Commercial Prospect Advisor, a PC-based expert system that provides salespeople with information on prospective customers. A sales representative can learn, for example, how much a prospect is spending on long-distance services, the chief contact there and details about the business. The system is also useful for qualifying new prospects; one can ask a question such as, "Who in my ZIP code spends $3,000 per month on telecommunications?" Much of the data comes from reports from external information services.

"This data previously took days to accumulate, during which time new business could be lost," Ditchfield says. "Now our salespeople can 'grab and go.' "

KEEPING CURRENT

Another new tool is Pricer, just piloted in the Midwest, which helps salespeople quickly compose accurate pricing proposals for prospects. With tariff rates changing almost daily and differing from state to state, salespeople are hard-pressed to provide accurate quotes. Pricer provides current tariff rates on-line and allows salespeople to play out what-if scenarios on configurations for services such as T1 lines.

The system centralizes the data once contained in several different pricing tools, such as printed tariff books. The advantage to the expert system format is that pricing models can be updated simply by changing the rule base rather than by rewriting code.

On the billing side, Netcap (Network Capability) is a new real-time order entry system that lets customers sign up for toll-free 800 service almost instantly. Previously, a customer would speak by telephone to an order entry clerk who would shunt the order into a queue to await fulfillment.

MCI's instruction book for setting up the accounts spans 22 pages; it typically took two days to structure an order. Now, however, order entry is integrated with the network so that a new service is ready within 10 minutes of the initial phone call.

Billing is a customer-sensitive component of a broader and more complex issue: giving large telecommunications users greater control of their voice and data traffic as it moves through common carriers.

NETWORKED RESPONSE

MCI is attempting to respond with Integrated Network Management Services, a family of technologies and applications that will let customers monitor, analyze and control their MCI voice and data traffic from a single computer terminal by using Netview, IBM's network management system.

In a company as driven by technology as MCI — it plans to spend $900 million this year to upgrade its communications systems — IS plays a critical role. But the corporate culture is also an important factor in new product development.

MCI's culture encourages frequent and open communication among all employees — an approach that prompted management consultant Tom Peters to brand the company "18,000 crazies."

The Commercial Prospect Advisor was born when division managers told Ditchfield during a weekly video conference that they needed help distributing more information to the sales force, which was suffering from a research backlog.

An integral part of MCI's brainstorming culture is its own electronic mail network; employees love to talk to one another. In fact, MCI's successful facsimile service, launched late last year, began as an E-mail query from Chairman William McGowan to the IS department and became a viable product a scant six months later.

BREAKFAST BRAINSTORMING

Within the IS department, "Doughnuts with Ditchfield" brings together a dozen staff members periodically to discuss anything about the business. Elsewhere, when good ideas arise, Ditchfield is quick to offer cash on the spot — $1,000 to one employee who wrote a new budget system on his own initiative — or to reallocate a staff member to a hot new project.

The long-distance communications business is a marketing game at heart. The differentiating factor among competing firms is how successfully they give customers the products and services in demand.

As MCI strengthens its balance sheet and evolves a technology infrastructure that accommodates rapid enhancements to its network, there is every chance that the company will head into the 1990s and even beyond as a formidable player.

BERNSTEIN IS PROPRIETOR OF GAVROCHE ASSOCIATES, A COMMUNICATIONS CONSULTING FIRM IN BALTIMORE.

Utilities

COMPANIES ARE RANKED BY INDUSTRY ACCORDING TO CW 100 INDEX.
*ESTIMATES ARE FROM *COMPUTERWORLD* SOURCES, NOT THE COMPANY.

Industry rank	Company Location Total employees	Premier 100 rank	Total score	Total revenue (millions)	1988 profits (millions)	Estimated IS budget (millions)
1	**MCI Communications Corp.** Arlington, VA 15,900	1	29,835	$5,137	$356	$285
2	**GTE Corp.** Stamford, CT 160,000	2	29,295	$16,460	$1,225	$750
3	**Contel Corp.*** Atlanta, GA 22,200	9	28,030	$2,964	$276	$150
4	**Bell Atlantic Corp.** Arlington, VA 81,000	14	27,565	$10,880	$1,317	$635
5	**Southwestern Bell Corp.** St. Louis, MO 66,000	21	26,850	$8,453	$1,060	$366
6	**AT&T*** Warren, NJ 303,600	23	26,720	$35,210	($1,669)	$600
7	**Northeast Utilities** Hartford, CT 9,200	28	26,405	$2,079	$234	$71
8	**US West** Englewood, CO 69,100	30	26,300	$9,221	$1,132	$250
9	**Entergy Corp.** New Orleans, LA 13,400	86	24,265	$3,565	$411	$82
10	**Duke Power Co.** Charlotte, NC 20,100	94	24,005	$3,627	$448	$68

IS Services Keep Airline Aloft Despite AMR's New Competition

By David A. Ludlum

American Airlines enjoys an advantage that many chief executive officers would give anything to possess. But owning the most successful computerized reservation service poses some unique challenges: How do you top what you've already accomplished?

The problem takes on a new dimension in light of AMR Corp.'s five-year plan, which envisions American's parent company expanding by two-thirds — from 75,000 employees today to 120,000 by 1994.

AMR's information systems investment totals $1.2 billion, which is nearly 14% of its revenue — a large amount for any company. That ratio, in addition to other criteria, places American at the top of the transportation industry and second place overall in this year's *Computerworld Premier 100.*

"Clearly, if you look at whose traffic is growing the most rapidly, it is the airlines that have reservation systems, and American is swamping everyone," says John Pincavage, an airline industry analyst at securities firm Paine Webber, Inc. In June, the most recent month for which figures are available, American had the largest share of U.S. airline traffic, at 21.8%.

American dropped a plan with Delta Air Lines to merge its reservation systems after the U.S. Justice Department threatened to block the deal, citing threats to competition in both the reservation and airline businesses.

Stan Wolenski

AMR's Hopper *pilots three-pronged information systems strategy*

STEP IN TIME

Earlier this year, American installed a new manager with no information systems experience to head its internal IS organization with the mandate of harnessing the organization to AMR's five-year plan.

Thomas J. Kiernan, the new president of American's Sabre Computer Services Division, brings extensive airline experience to the internal IS organization. With 21 years of service, he has been at American longer than any other top manager, working in finance, administration, marketing, planning and operations. He also was president of an AMR subsidiary that provides ground support services to other airlines.

"I'm trying to make sure the plan we put in place here is in lockstep with the rest of the company," Kiernan says of his new assignment. "I am trying to address some management issues in terms of how we're structured, how we relate to our customers, how we measure our performance, how we hold folks accountable, how we motivate people, recruit people, pay people."

Kiernan's organization is part of a three-pronged IS strategy at AMR. His Sabre Computer Services Division provides support for American Airlines, whose ticket sales generated 85% of the parent company's total revenue of $8.8 billion last year.

The second prong is the Sabre Travel Information Network. Also a division of American, it sells reservations, ticketing and other travel-related information services and software to travel agencies, corporate travel managers and individuals.

With Sabre facing an increasingly saturated domestic market and stiffened competition from rival services owned by combinations of airlines, the profits it generates for AMR have seesawed, as has growth in its revenue.

Last year, Sabre generated operating earnings of $134 million, 17% of AMR's total and $17 million less than the previous year's $151 million. The Sabre network brought in revenue of $495 million, 6% of the AMR total and 10% more than the $450 million for 1987.

The third thrust of AMR's information technology strategy is AMR Information Services, Inc. A subsidiary separate from the airline, it consists of seven business units that sell information services to other airlines, hotel and car-rental companies, freight shippers and telemarketers and provide technical training and data entry services.

Stan Wolenski

American's Kiernan *will line up info systems behind the business plan*

OVERSEEING THREE

Max D. Hopper, AMR's senior vice-president of IS, holds sway over the three thrusts of the information technology strategy. Hopper has the same title at American that he has at AMR, overseeing both Kiernan's internal IS organization and the Sabre Travel Information Network run by Kathleen M. Misunas. He is also vice-chairman of AMR Information Services, supervising its president, Russell J. Harrison.

These days, Hopper's priorities are to support the airline and knit its systems more closely together with the external Sabre network. "Just trying to find ways to stay even with our [projected] growth is a major challenge," Hopper says.

Hopper contends that both domestic and global revenue growth still lie ahead for Sabre, predicting the network will add more than 1,000 travel agency clients this year, an increase of about 8%. "We'll add at least that much in terms of volume of traffic and revenue," he says. "It's true that in the domestic market, we have to take it away from our competitors now, which is tougher to do. But with a reasonable economy and our worldwide expansion, we think there's still some strength in the old dog yet.

> *"If you look at whose traffic is growing the most rapidly, it is the airlines that have reservation systems, and American is swamping everyone."*
>
> **— John Pincavage**
> **Paine Webber**

"I like my position a lot better than I would like being any of my competitors," Hopper says.

To continue its growth, American is installing Interact, a $150 million network of personal computers for communications and office automation to be rolled out over five years. The system is aimed at giving workers access to business data and manuals that are difficult to get at today. It will also allow them to use their PCs to exchange forms and documents.

"We believe it will empower a lot more folks to do their jobs better, ultimately producing better levels of service for our customers, and that's kind of the name of the game," Kiernan says.

In another undertaking, American's top management recently approved a plan to consolidate Sabre with the internal network currently in place and the existing portion of Interact's communication links, forming a unified packet-switched backbone.

At the same time, Hopper is considering breaking out parts of Sabre, perhaps running them in separate operating environments. The leading candidate is the system for pricing flights, which involves a small database but consumes a big chunk of the number-crunching power of the Sabre network's eight dual-processor IBM 3090 Model 200Es.

This summer, American began building a "decision data store" — a collection of both internal and external information commonly used in making decisions. As with Interact, the idea is to avoid the need for digging out data manually.

For example, Kiernan says, the data store may allow analysts to compare profits for one of American's routes with a competitor’s flight while considering American’s baggage handling and reliability on the route.

“We might be able to draw together diverse pieces of information into a single analysis very quickly,” Kiernan says. “That way, we can find out where our problems are rather than just know we have one.”

PROFIT PRESSURE COOKER

Over at Sabre Travel Information Network, profits have come under pressure from aggressive marketing of rival systems that in recent years have shifted to ownership by groups of airlines. Texas Air’s System One supports Eastern Airlines and Continental Airlines; Programmed Airline Reservation System, or PARS, is jointly owned by Trans World Airlines and Northwest Airlines; Apollo is controlled by the Covia Corp. partners — United Airlines, USAir and four European carriers.

Sabre and its competitors are granting travel agencies discounts as never before, and Sabre rivals are offering to pay legal bills for agencies seeking to escape Sabre’s restrictive five-year contracts.

“What we’ve seen is that the margin has declined as the number of agencies getting discounts has increased,” Hopper says. “What we’ve done is maintained profit levels, although [profit as a percent of revenue] has declined somewhat.”

Transportation

COMPANIES ARE RANKED BY INDUSTRY ACCORDING TO CW 100 INDEX.
*ESTIMATES ARE FROM *COMPUTERWORLD* SOURCES, NOT THE COMPANY.

Industry rank	Company Location Total employees	Premier 100 rank	Total score	Total revenue (millions)	1988 profits (millions)	Estimated IS budget (millions)
1	**AMR Corp.** Dallas, TX 67,900	3	29,020	$8,824	$477	$1,225
2	**American President Cos.** Oakland, CA 4,200	11	27,820	$2,131	$81	$110
3	**Federal Express Corp.** Memphis, TN 48,600	46	25,540	$4,244	$210	$200
4	**USAir Group*** Washington, D.C. 46,900	82	24,380	$5,707	$165	$228
5	**Yellow Freight Systems*** Overland Park, KY 27,200	87	24,240	$2,016	$69	$81
6	**The Greyhound Corp.*** Phoenix, AZ 37,200	101	23,805	$3,305	$93	$74
7	**Union Pacific Corp.** St. Louis, MO 47,300	108	23,650	$6,068	$644	$300
8	**United Air Lines** Chicago, IL 66,000	160	22,700	$8,982	$1,124	$300
9	**Roadway Services, Inc.*** Akron, OH 29,500	161	22,600	$2,185	$80	$87
10	**The Hertz Corp.** New York, NY 4,200	168	22,420	$2,131	$81	$110

With its competitors, Sabre is looking abroad for rapid growth. In Europe, however, two airline consortiums are building rival systems as Sabre braves it alone on the outside. Covia is a partner in Europe’s Galileo consortium, and IBM has subcontracted software work for the Amadeus consortium to System One.

> ***“We believe Interact will empower a lot more folks to do their jobs better, ultimately producing better levels of service for our customers, and that’s kind of the name of the game.”***
>
> **— Thomas J. Kiernan**
> **American Airlines**

Earlier this year, AMR convinced Europe’s national airlines to let Sabre issue their tickets, a prerequisite for conducting significant business in their home countries.

Also, European regulators recently issued rules reasonably accommodating to reservations services controlled by one airline, Hopper says. But he concedes that Sabre probably cannot equal the market share of the European national carriers in their home countries.

AMR has teamed up with Qantas Airways to install Sabre in Australia. It has forged a link between Sabre and the All Nippon Airways reservation system and is exploring possible relationships with Japan Airlines. “Right now, I think it’s safe to say Sabre is being marketed aggressively in Australia,” Hopper says. “In Japan, it’s being used, but we have chosen not to market directly as yet. We would rather try to find a way to do that in partnership.”

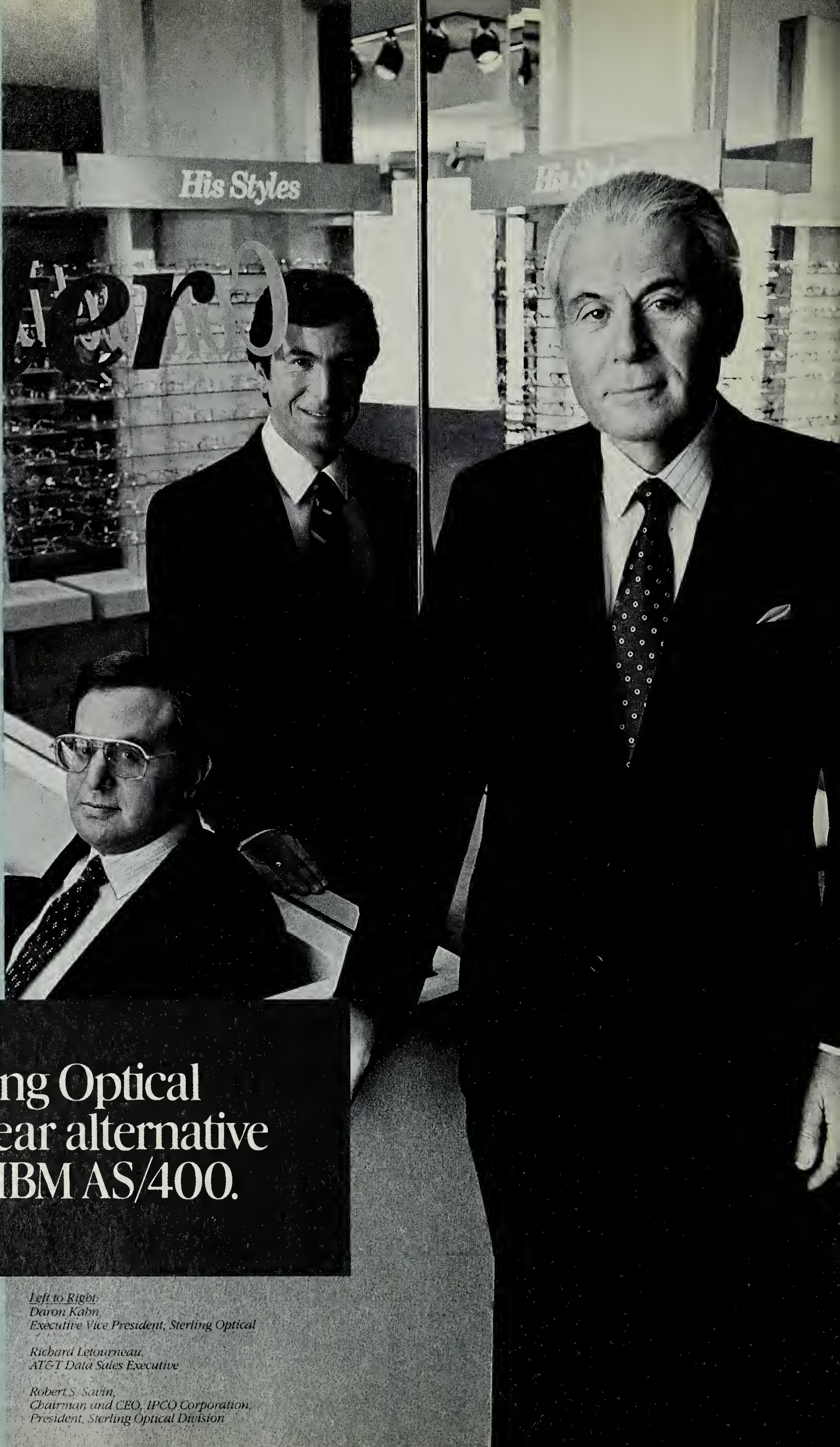
LUDLUM IS A *COMPUTERWORLD* SENIOR WRITER.

One sells eyeglasses.

One moves trains, another trucks, another buses. One helps bankers bank, one, teachers teach. They don't look alike, speak alike, or think alike.

But each attacks business in the same special way.

Perhaps, in the same way that you would like to.



Sterling Optical sees a clear alternative to the IBM AS/400.

Left to Right:
Daron Kahn,
Executive Vice President, Sterling Optical

Richard Letourneau,
AT&T Data Sales Executive

Robert S. Savin,
Chairman and CEO, IPCO Corporation,
President, Sterling Optical Division

Chesterfield, Missouri
February 28, 1989

Sterling Optical, one of the leading optical chains in the country, was looking for a way to get a jump on their competitors in the retail eyeglass and eyecare marketplace. Sterling Optical's Bob Savin, Daron Kahn and AT&T's Rich Letourneau discuss how AT&T developed an open systems-based, retail point-of-sale system to network their 250 stores nationwide.

Sterling: We were getting frustrated by the delays we were facing with the old way of doing things. Our customers were unhappy, we were unhappy, and headquarters wasn't able to keep up with the volume of requests. We knew a highly integrated distributed networked computing solution was the only way to go.

AT&T: And you wanted to preserve the investments you'd already made in applications software—especially those on the System/38.

Sterling: Absolutely. All our RPG-coded customer records and our inventory control system are stored in the database at headquarters. The retail business is demanding—you can't afford to wait to implement brand-new technology. Plus, we don't have a very large computer programming department, and in order to develop, modify, or change corporate programs on the System/38, it's a big effort, and it takes a lot of time.

AT&T: That's why we built our multiuser platform based on the UNIX® System V operating system. We gave you the tools to develop new applications and get them into the mainstream of your business quickly.

Sterling: It made sense. We were able to keep our hardware and software *and* install AT&T 6386 WorkGroup Systems in our stores. Now, on a daily basis, we know what's selling and what's not. We even included an employee time and attendance system that feeds into our existing payroll system.

AT&T: And you've kept your system options open. You can modify any part of the system at any time. Like when you added the automatic pricing software.

Sterling: Right. I think what we like most about the system is its simplicity. Despite the complexity of the information handled, it really gives us easy access to our information. We need that to improve the profit potential of our business, and to maintain our lead in the industry.

AT&T: The system also provides investment protection for what you have today, and a gradual growth path to what you'll need tomorrow.

Sterling: One of the most striking things was AT&T's commitment to service. We came from an environment where it wasn't uncommon to be down for two to three or four days, waiting for equipment to be shipped or repaired.

AT&T: Our message was simple: AT&T wants your business.

Sterling: You were here working as much as we were. And you really listened to us. Of all the vendors we spoke to, you gave us the best proposal, the best equipment, and the best price. In fact, we're so excited about the new system, we wrote it up in our company newsletter.

AT&T: I heard! Can we get a copy?

Sterling: Sure. The only catch is, you have to read it from across the room with one eye closed.

The Sterling Optical Computer Solution:

THE CHALLENGE:

Create a point-of-sale computer system specific to the optical retail business for the 250-store nationwide Sterling Optical chain.

THE SOLUTION:

AT&T created a UNIX System V-based network of AT&T 6386 WorkGroup Systems and AT&T 605 terminals chain-wide. At headquarters, an AT&T 3B2/500 gathers orders and information from each store daily. The system allows a smooth link between the 3B2/500 computer and the existing IBM System/38. A custom INFORMIX database management system forms the heart of the applications software.

THE RESULT:

Sterling Optical customers are getting better service. All store locations will be using one standard point-of-sale system that provides increased productivity, a friendlier working environment, and greatly enhances Sterling Optical's competitiveness in the industry.

Call your AT&T Account Executive, AT&T Authorized Reseller, or 1 800 247-1212, Ext. 530.

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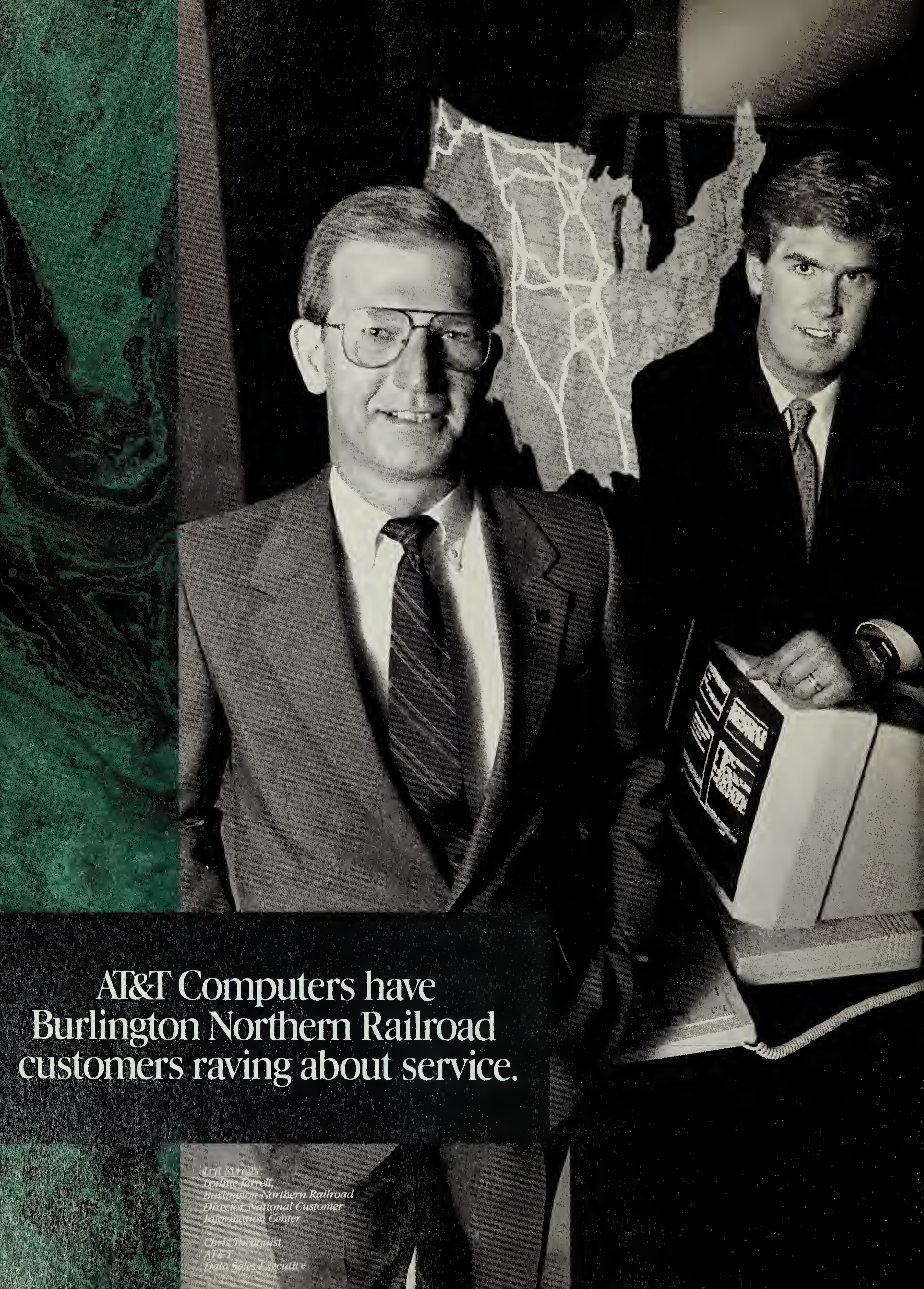
AT&T
Computer Systems



Left to right:
Lonnie Jarrell,
Burlington Northern Railroad
Director, National Customer
Information Center

Chris Thruquist,
AT&T
Data Sales Executive

Denver, Colorado
May 2, 1989

The Burlington Northern National TrackSmart® Center is getting rave reviews from its customers. And AT&T's distributed networked computer solution behind it is getting rave reviews from Burlington Northern. Burlington Northern's Lonnie Jarrell tells AT&T's Chris Turnquist why AT&T Computers provide a better way to serve customers of the longest railroad in the country.

Lonnie: We want to be known for superior customer service. So we planned proactive shipment monitoring through a new customer service concept—the National TrackSmart Center.

Chris: And better customer service means getting information to your customers, in *their* reporting format, as soon as your reps have it.

Lonnie: Exactly. All we had to do was listen to our customers to understand their transportation information needs. That was plenty of inspiration. We knew then that we needed a system that would let our reps instantly locate cars and report shipment status to customers immediately.

Chris: I remember when your reps could only handle one customer at a time. They had to query the mainframe database car by car. And *then* manually record their findings and send them out. Now each rep can handle up to ten customers, right?

Lonnie: Absolutely, plus the rep has more time to serve his customers better. Now they save time by tracking every car from *one* CRT. The AT&T 6500 Multifunction Communications System gives them multi-window access to two synchronous sessions on our host, as well as async access to the TrackSmart application and AT&T Mail. Both TrackSmart and AT&T Mail run concurrently on the AT&T 3B2/1000 Computer. So the reps get information the second they need it.

Chris: And you're able to tap information easily.

Lonnie: Right. Because you molded AT&T distributed networked computing to fit the Burlington Northern, rather than the other way around. You provide it all—computer networking systems and communications expertise. Plus you blend it all together with other systems better than any company I've ever seen.

Chris: I understand one customer wrote a BN rep promising him an official company ID naming him their Assistant Transportation Manager.

Lonnie: That's true. But you know, if we're going to be a partner to our customers, we have to be a partner with vendors who can take us in that direction.

The Burlington Northern Computer Solution

THE CHALLENGE:

Differentiate Burlington Northern as a superior provider of customer service.

THE SOLUTION:

A distributed networked computer solution integrating Burlington Northern's applications with a UNIX® System V-based Informix® 4GL database management package. An AT&T 3B2/1000 Computer is the gateway to the host for TrackSmart information. The AT&T 6500 Multifunction Communications System provides host access with four window functions appearing on AT&T 6539 displays. AT&T Mail sets up an E-mail link between reps and customers; AT&T Mail with Private Message Exchange/TERM is a private E-mail link between Burlington Northern reps and TrackSmart.

THE RESULTS:

The system increases the number of customers a representative services tenfold. Some customers have indicated TrackSmart saves them at least four hours daily.

Call your AT&T Account Executive, AT&T Authorized Value Added Reseller or 1 800 247-1212, Ext. 527.

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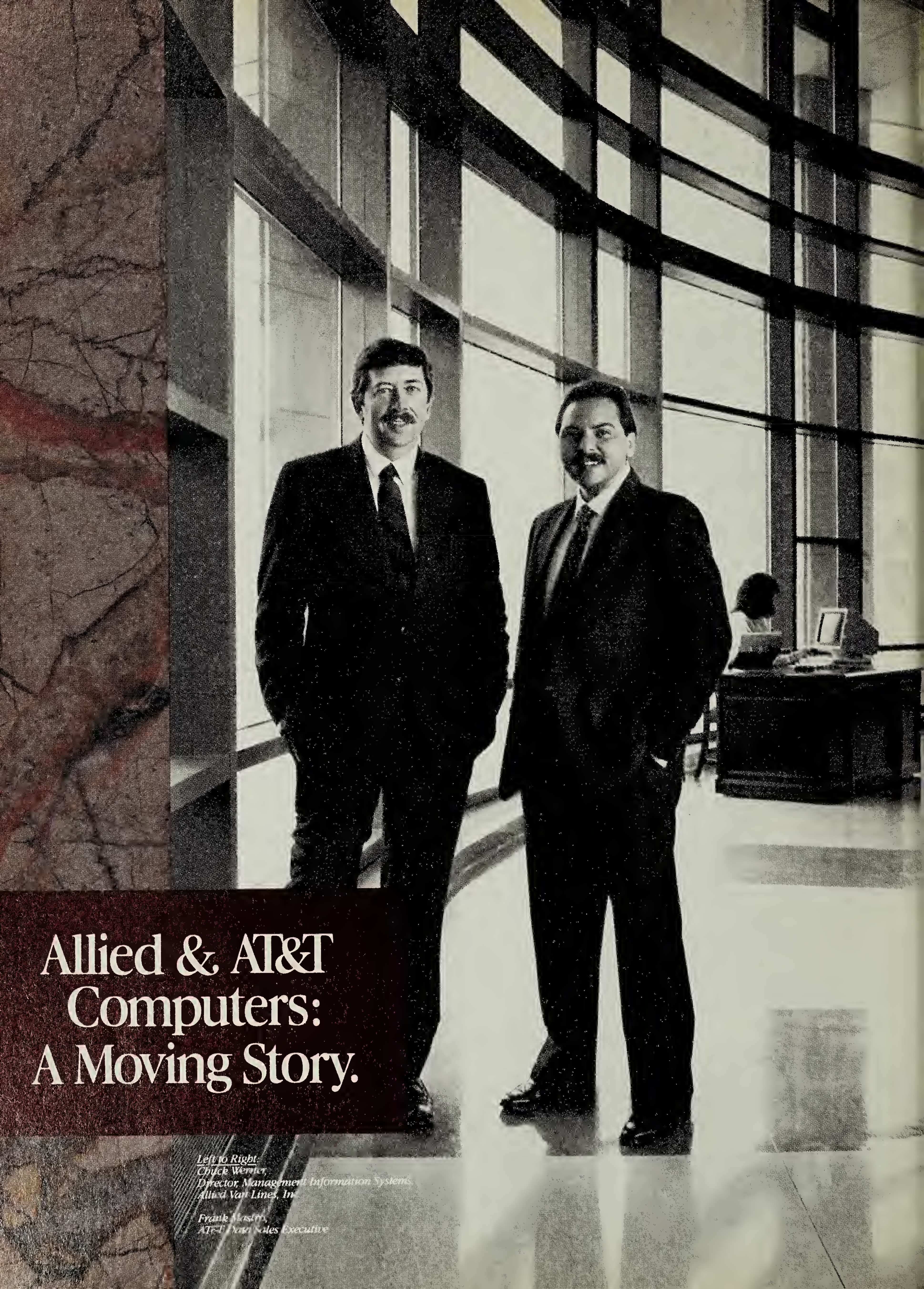

Allied & AT&T Computers: A Moving Story.

Left to Right:
Chuck Werner,
Director, Management Information Systems,
Allied Van Lines, Inc.

Frank Mastro,
AT&T Data Sales Executive

Chicago, Illinois
February 23, 1989

Recently, Allied® Van Lines tied their corporate computer systems into one fast, efficient, distributed computer network. Allied's Chuck Werner tells AT&T's Frank Mastro how AT&T's Distributed Network solution saved money for Allied and improved agent service.

Frank: You guys are pretty tough customers.

Chuck: (Laughs) You bet! There were a lot of frustrated folks here; some managers had to use six terminals to get complete answers about billing, tariffs, etc. We'd seen the power of distributed networked computing when you linked Purchasing's AT&T 3B2 computers to Accounting's IBM host. We wanted more, and we wanted it fast.

Frank: Many companies are trying to manage multi-vendor systems and applications, but yours were particularly complicated.

Chuck: Believe it or not, we were running accounting on the IBM 3090, claims insurance on the Qantel, tariffs on the DEC PDP, and claims checking on the Wang.

Frank: None of the computers could talk to each other. People really needed six terminals to answer some questions.

Chuck: We had to have true distributed processing, and AT&T was the proven choice. You have a technical edge with the Information Systems Network. Because ISN allows transparent access to *all* our different systems, we could replace six terminals with one AT&T 605.

Frank: Now a claim or bill is just a hot key away.

Chuck: Plus ISN saved us money when we moved to our new data center. We didn't have to rewrite applications; we just moved everything we already had, and plugged into the ISNs through voice wiring paths. No one believed it—true investment protection!

Frank: I'll never forget *that* weekend.

Chuck: We now respond to 95% of our agents' questions in three seconds. And we're seeing cost savings already. AT&T 605 terminals each cost less than six months' rent on the old IBM terminals. We'll save a half-million dollars in expenses this year alone.

Frank: Plus everything runs over AT&T fiber-optic cable and twisted-pair wiring in your new building, instead of coax; you saved there, too.

Chuck: Right. We're delighted distributed networking customers of AT&T. We've had 3B2 computers in the field for years, handling shipment registration and accounting for agents. Your solutions are elegant: that's why your RFP won this time, over five other vendors. You know how to make our agents happy, and when they're happy, we're happy.

The Allied Computer Solution:

THE CHALLENGE:

Create a cost-effective, distributed network for Allied. Link mainframes and minicomputers into an efficient network. Streamline agent operations; quicken their response time.

THE SOLUTION:

A custom campus network system. AT&T Information Systems Network (ISN) and AT&T 605 terminals interconnect four different hosts. AT&T 3B2 computers help agents track shipments, and provide host connectivity. AT&T Premises Distribution System (PDS) provides fiber-optic and twisted-pair distribution media.

THE RESULTS:

A distributed networked computing solution serving Allied's more than 500 remote agents and their worldwide customers efficiently. Major cost savings on equipment and overhead. Improved agent productivity and service. An open environment for expansion into ISDN.

Call your AT&T Account Executive, AT&T Authorized Reseller, or 1 800 247-1212, Ext. 531.

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AT&T
Computer Systems

How AT&T Computers Help Greyhound Run Five Times Faster.

Left to Right:
Craig Lentzsch,
Vice Chairman and
Executive Vice President,
Greyhound Lines, Inc.

Dennis Connor, Senior Director,
Management Information Systems,
Greyhound Lines, Inc.

Tim Stanley,
AT&T Data Sales Executive

Dallas, Texas
March 1, 1989

Tim: The first time we met, you had an ambitious plan to completely automate your scheduling and ticketing operation. I was astonished at its complexity. You have 165,000 combinations of fares that a customer could ask for.

Craig: Ticketing automation was part of our master plan to remake Greyhound from the ground up. You can see why.

Dennis: Our old ticketing system wasn't good enough. We had trouble with volume and updating the point-of-sale terminals. Frequently the agents would have to thumb through thick manuals to get fare and schedule data.

Craig: It took three or more minutes to issue a ticket, which was not acceptable. You helped us design our ticketing solution based on AT&T WorkGroup System computers.

Tim: And today you have happier customers!

Dennis: Ticketing is five times faster. Customers tell us they get faster service in bus stations than airports. These lines *move*.

Craig: Since we can't afford downtime, your top-to-bottom commitment to supporting the total solution sold us on AT&T. We saw you as a partner for computer solutions, not a PC vendor. Anyone can sell PCs or minis.

Dennis: You were the only computer company with a nationwide service network and the willingness to respond to us on demand.

Craig: We won't stop with passenger ticketing. Distributed computer networking is our leverage to improve package express service in a major way.

Dennis: We are tying our networks together. Whether it's packages or people, it's one screen.

Tim: And the distributed solution includes the bus scheduling system running on both your Tandem computer in Omaha and the IBM mainframe in Des Moines.

Craig: The AT&T system is open. And it has growth capabilities, so that when we see an opportunity, we can take it. I'm very proud of what we've done. As our motto says, "the bus is back."

The Greyhound Computer Solution:

THE CHALLENGE:

Create a cost-effective, reliable, point-of-sale ticketing and scheduling solution for Greyhound nationwide ticketing agents in transportation centers.

THE SOLUTION:

A PC workgroup solution, including AT&T 6300 and 6312 WorkGroup Systems and Model 570 printers throughout the nationwide Greyhound agent system.

THE RESULTS:

Ticketing is five times faster. And the system is a key to the future integration of all Greyhound computer networks handling routing, fare changes, package express, maintenance and data communications.

Learn more. Call your AT&T Account Executive, AT&T Authorized Reseller, or 1 800 247-1212, Ext. 532.

Your Computing Systems And Networking Solutions Company

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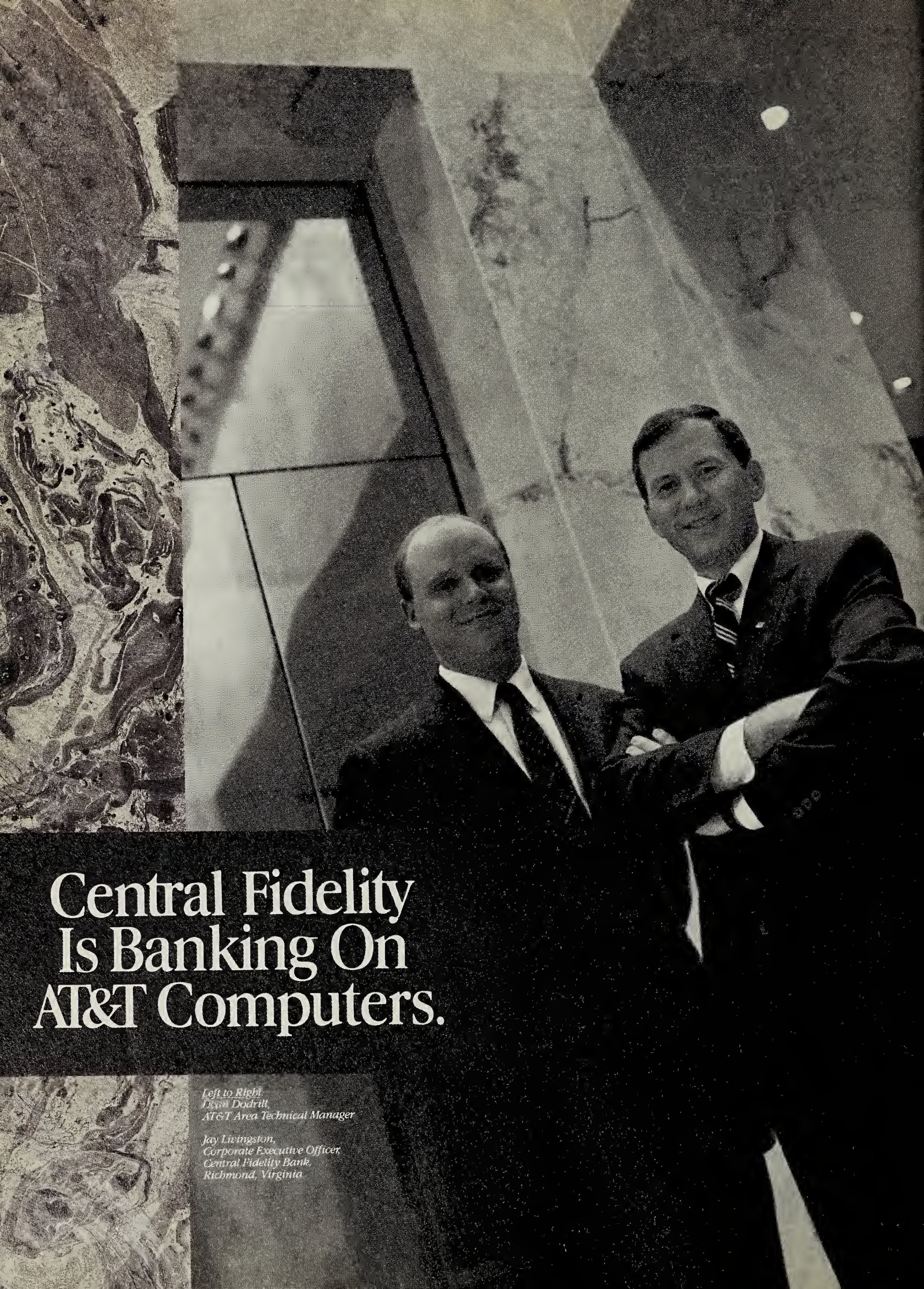

Left to Right,
Dean Dodrill,
AT&T Area Technical Manager

Jay Livingston,
Corporate Executive Officer,
Central Fidelity Bank,
Richmond, Virginia

Richmond, Virginia
February 2, 1989

Central Fidelity Bank is among the nation's top 100 commercial banks with $4.8 billion in assets. Looking to extend its fourteen-year record earnings streak, the bank commissioned its data processing division to deliver a vital strategic initiative, improve productivity, enhance sales opportunities, and provide faster customer service in the bank's nearly two hundred branch offices. Jay Livingston met recently with Dean Dodrill of AT&T to review their work together.

Jay: Service is what bank customers expect. Faster service improves customer satisfaction and leads to more profitable relationships. When you speed up service, everyone is more productive, and we can spend more time with customers selling the bank's financial products.

Dean: Service and selling both depend on information. Our challenge was to provide the branches with rapid access to customer information and present that information to branch personnel in the most meaningful way. This could only be accomplished with a distributed, networked computing approach.

Jay: That's right. Our first priority was service and sales support in our branches, which meant fast, accurate retrieval and dispersal of information was crucial. AT&T's banking architecture provided that.

Dean: Early on, you talked about cost-effectiveness, return on investment, and a strategy for future growth and functionality. Remember that?

Jay: With an emphasis on profitability. We had major investments in existing systems and a lot of branches. AT&T's open systems approach didn't require trade-offs or expensive host additions, which is one of the reasons you got the business. AT&T's creative alternatives surprised us.

Dean: The ease of networking AT&T WGS computers was fundamental to our proposal. We delivered maximum functionality, flexibility, and reliability to every workstation in each branch.

Jay: And StarLAN was a terrific way to connect and share branch resources. You made the most of our assets, including the intangible ones.

Dean: Like your customer databases—we found ways to further develop relationships with existing customers. The applications development tools we built saved time for your developers. New products and services can now be added quickly to both platform and teller software, so service and sales can continually improve.

Jay: Every bank employee associated with this system has become more productive. In my twenty-three years of banking, I've never seen a vendor provide such high-quality service and support. Central Fidelity Bank and AT&T are well positioned for the future.

The Central Fidelity Computer Solution:

THE CHALLENGE:

Build a distributed, networked computing solution that would improve productivity, customer service, and sales.

THE RESPONSE:

The AT&T Retail Banking Solution. An integrated systems solution that provides effective bank branch platform and teller automation. Supported by AT&T WorkGroup Systems, AT&T StarLAN, and software provided by OnLine Financial Communications Systems, Inc. And AT&T Application Foundation developed by AT&T Bell Laboratories provides a highly productive software customization environment.

THE RESULTS:

Better customer service. Expanded sales opportunities. Higher productivity.

To learn more, contact your AT&T Account Executive, or call 1 800 247-1212, Ext. 533.

Your Computing Systems
And Networking
Solutions Company

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AT&T
Computer Systems

These men started a revolution on campus.

Left to Right:
Dan Goulet, Ph.D.,
Director, Academic
Computing Services,
University of Wisconsin/
Stevens Point

Jim Leonhart,
AT&T National
Account Manager

University of Wisconsin
January 22, 1989

Recently, an information management revolution occurred at the University of Wisconsin–Stevens Point. Dan Goulet from the University and Jim Leonhart of AT&T—campus radicals of a different kind—explain how they were able to realize a bold and complex vision.

Jim: I remember the first day we met. You had been around the block a few times, but weren't getting the answers you needed.

Dan: We wanted to create a unique education environment: a free-flowing on-line computer campus. We had a vision, and we were looking for someone to help build it.

Jim: A distributed networked computing solution, that's what we'd call it now: a way to process, move and manage information effectively, throughout a widespread organization.

Dan: We talked to many computer vendors before you. We got tired of describing what we needed, so we drew it. That graphic was about 13 feet long.

Jim: More like twenty. The chart showed every information resource on campus linked together, accessible to students, faculty, and administration. It became the wallpaper in my office for fifteen months.

Dan: It was like a blueprint for a data superhighway.

Jim: We put our ISN wide-area network at the center—like an interchange—and built fiber and twisted-pair data lanes to applications running on AT&T 3B2s, DEC, UNISYS and other hosts located in all the departments. We put on- and off-ramps in strategic locations: StarLAN networks that gave access to the highway from workstations.

Dan: We designed everything from the user perspective. The more technically remarkable the system became, the harder we worked to make it approachable.

Jim: Easy for novices, powerful enough for programming students.

Dan: We developed a menu-driven user interface that is consistent and clear. Students and faculty can select applications like checking spelling, transmitting course grades, even browsing through the on-line card catalog of 1.5 million books at the University of Wisconsin–Madison. We wanted desktop power and access, but we wanted to process information where it made the most sense.

Jim: Thinking back, we realized early that the complexity of your vision precluded a single-system focus. You needed open systems.

Dan: You were really the only ones that understood this point. Open systems allow us to use off-the-shelf components; vendors have to bid against each other to get our business. Open systems are the secret.

Jim: It's mind-boggling how much computer power is out there. We wanted to harness it all, yet give a piece to every individual.

Dan: A truly distributed network, one we don't think we'll ever outgrow. We've added 300 WGS workstations in the last five months.

Jim: Dan, where in the world is that wallpaper today?

Dan: We had it bronzed. Today, so many colleges and businesses really need a similar solution. That's probably why we've had so many visits from them lately.

Jim: Little did we know back then, when we first met.

Dan: Oh, something tells me you had a hint.

The Stevens Point Computer Solution:

THE CHALLENGE:

Create a distributed computing revolution; link the campus into an integrated information resource open to every user.

THE SOLUTION:

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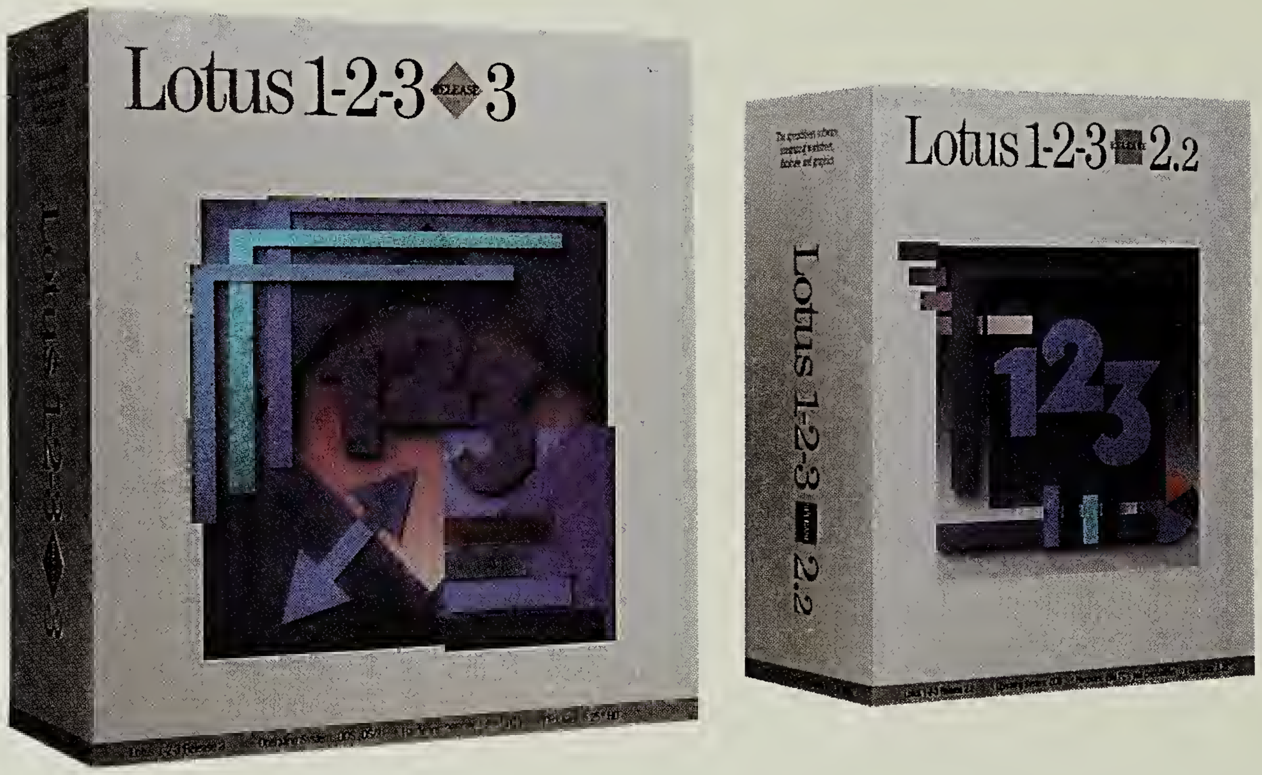

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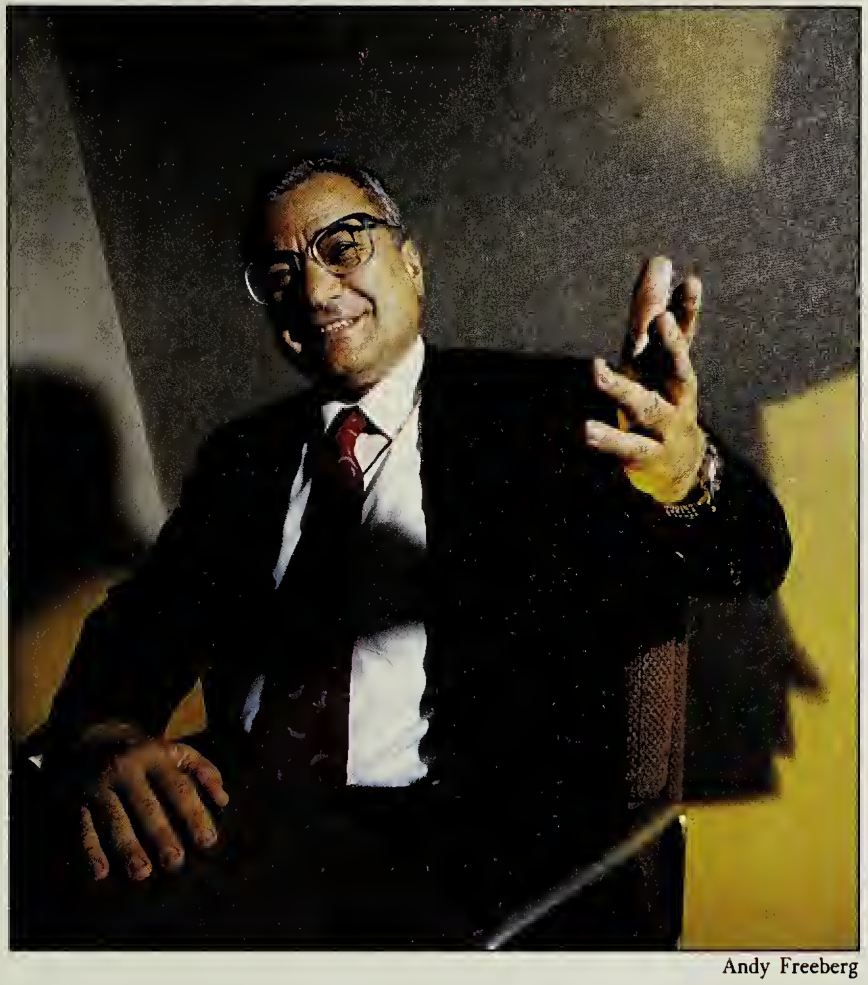

Andy Freeberg

Vona, executive vice-president, *sees technology as "an integral part of the fabric"*

Bankers Trust: One Step Ahead Through Decentralizing

By Suzanne Weixel

Four years ago, Bankers Trust New York Corp. stole a march on its competitors in the banking industry by restructuring its information systems to support newly developed self-managed profit centers.

Now, as other banks awaken to the value of flexible, independent units, Bankers Trust is poised to reap the benefits of moving first.

The change has radically transformed the bank from a traditional commercial bank into a powerful trading and merchant institution, says Raphael Soifer, a banking analyst at Brown Brothers Harriman & Co. in New York.

"They were the first of the major banks to break off their operating services into separate businesses, and they started reorganizing their systems early as well," he says. "Other banks are trying it now, but they are running into stumbling blocks. None of the others are quite as well managed as Bankers Trust."

Key to the success of the transition is to have a comprehensive technology architecture that provides a backbone of IS support for the profit centers.

This advanced planning and continued commitment to technology earned Bankers Trust a place at the top of the banking category in this year's *Computerworld Premier 100*, nudging it ahead of last year's leader, Banc One Corp.

The bank's IS restructuring has paid off in the following ways:

- Employee productivity has increased substantially. For example, 80% of all transactions in the bank's global money transfer are accomplished electronically with no staff intervention, according to a report by Salomon Brothers, Inc.

Ten years ago, Bankers Trust processed 4,000 transfers per day with 500 employees. Today, 220 employees process an average of 32,000 transactions per day.

- The bank's funds control system automatically checks that all money transfers meet the internal overdraft limits placed on each user of the system.
- Because the architecture ensures consistent designs regardless of what system is being used, it is possible for users at any one of a half-dozen data centers around the world to sit at a terminal and have real-time, on-line access to any service provided by any data center.

The bank is seeking further productivity improvements by installing fiber-optic communications networks and image processing systems.

WORK AS ONE

Behind the implementation of advanced technology is an understanding that systems must be integrated with the business to be successful.

"We decided right up front that in order for this architecture to work, we had to make technology an integral part of the fabric of our institution," says Carmine Vona, executive vice-president for worldwide technology.

The changes began at Bankers Trust a decade ago, when management — led by then and future chairmen Alfred Brittain III and Charles S. Sanford Jr. — decided that in

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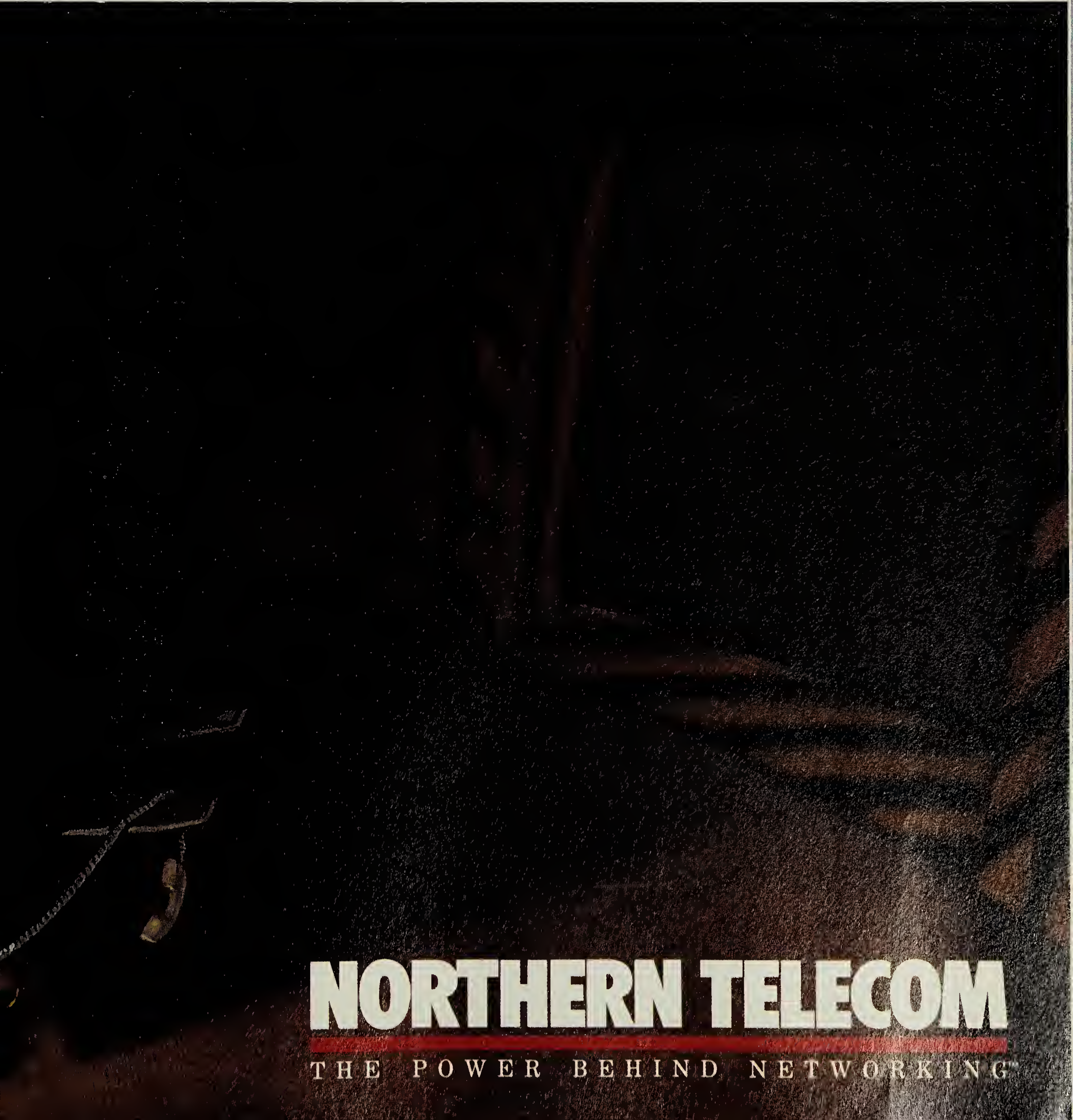

order to remain competitive in the industry, it was necessary to restructure. Over the next few years, however, in an innovative move, the bank sold its retail banking and credit card operations, reorganized its management from a typical bank's hierarchical bureaucracy to more of a horizontal structure and instituted a companywide philosophy of integration and cooperation.

FOLLOWING SUIT

Coincidentally, the Computer Systems Department (CSD) arrived at many of the same decisions concerning the best ways in which to implement technology at Bankers Trust.

In the early 1980s, the CSD had grown to a total of 1,400 employees and was mired in bureaucracy, delivering increasingly flawed applications and becoming more and more alienated from the user community.

Vona, then a division manager within the CSD, saw the trouble brewing. The malaise afflicting the IS organization at Bankers Trust was not unique. "We were experiencing the same level of pain as the average organization," he says. "We just came up with a unique remedy."

The solution: a decentralized, bankwide technical architecture. When Bankers Trust reorganized into independent profit centers, says Vona, it was only natural for the technology to follow suit.

Decentralization was an obvious cure for what troubled the CSD but one laden with side effects. As Vona tells it, the key was figuring out how to solve the problems associated with large centralized groups without falling into the traps posed by small decentralized groups.

Banking

COMPANIES ARE RANKED BY INDUSTRY ACCORDING TO CW 100 INDEX.
*ESTIMATES ARE FROM *COMPUTERWORLD* SOURCES, NOT THE COMPANY.

Industry rank	**Company** Location Total employees	Premier 100 rank	Total score	Total revenue (millions)	1988 profits (millions)	Estimated IS budget (millions)
1	**Bankers Trust** New York, NY 12,500	4	28,740	$5,851	$648	$370
2	**Banc One Corp.** Columbus, OH 16,900	5	28,501	$2,735	$340	$170
3	**Security Pacific Corp.** Los Angeles, CA 41,900	7	28,220	$8,483	$639	$440
4	**Norwest Corp.** Minneapolis, MN 15,600	15	27,450	$2,475	$211	$110
5	**Sovran Financial Corp.** Hyattsville, MD 14,400	39	25,820	$2,230	$243	$110
6	**Valley National Corp.** Phoenix, AZ 7,600	45	25,570	$1,147	$62	$53
7	**J.P. Morgan & Co.** * New York, NY 15,500	68	24,810	$7,839	$1,002	$345
8	**Shawmut National Corp.** Boston, MA 12,600	71	24,725	$2,811	$243	$128
9	**Signet Banking Corp.*** Richmond, VA 5,900	74	24,670	$1,239	$153	$55
10	**National City Corp.*** Cleveland, OH 14,100	81	24,410	$2,227	$233	$98

> ***Decentralization was an obvious cure for what troubled Bankers Trust's IS but one laden with side effects.***

Potential pitfalls of decentralization ranged from a proliferation of technologies, an inability to integrate systems and a duplication of efforts — all of which would lead to skyrocketing costs.

Anticipating the usual battles between business-minded managers and technology developers, Vona built the solution into the architectural plan.

Enlisting the support of top-level management, Vona specified that ultimate control over the types of technology and methodologies used by each business unit would remain in the hands of a small central staff of technology managers. Every expenditure over $10,000, the plan stated, must be approved by the small central group.

It took a year of debate among senior management, CSD management and the user community before his architecture was accepted, but in 1983 Vona was appointed deputy department head and put in charge of the team that would develop the architecture.

Once in place, the architecture guided the bank's technology plans, allowing IS to be a step ahead of the changes in the banking industry rather than simply reacting to them.

Weixel is a free-lance writer based in Framingham, Mass.

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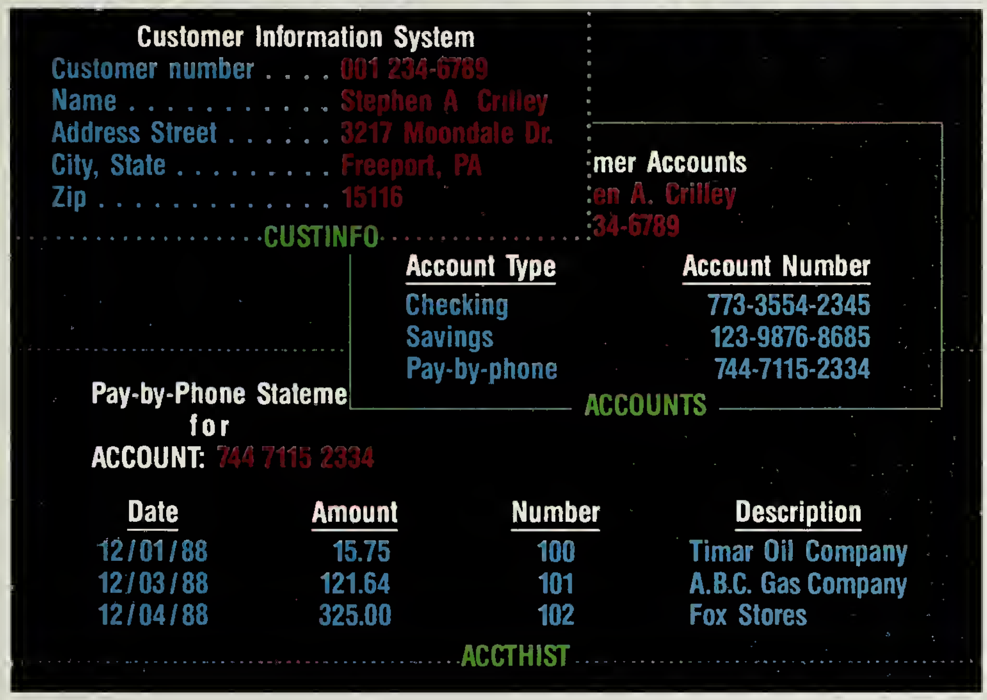

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Strategy Pays Off in Defense Contracts for General Dynamics

By Connie Winkler

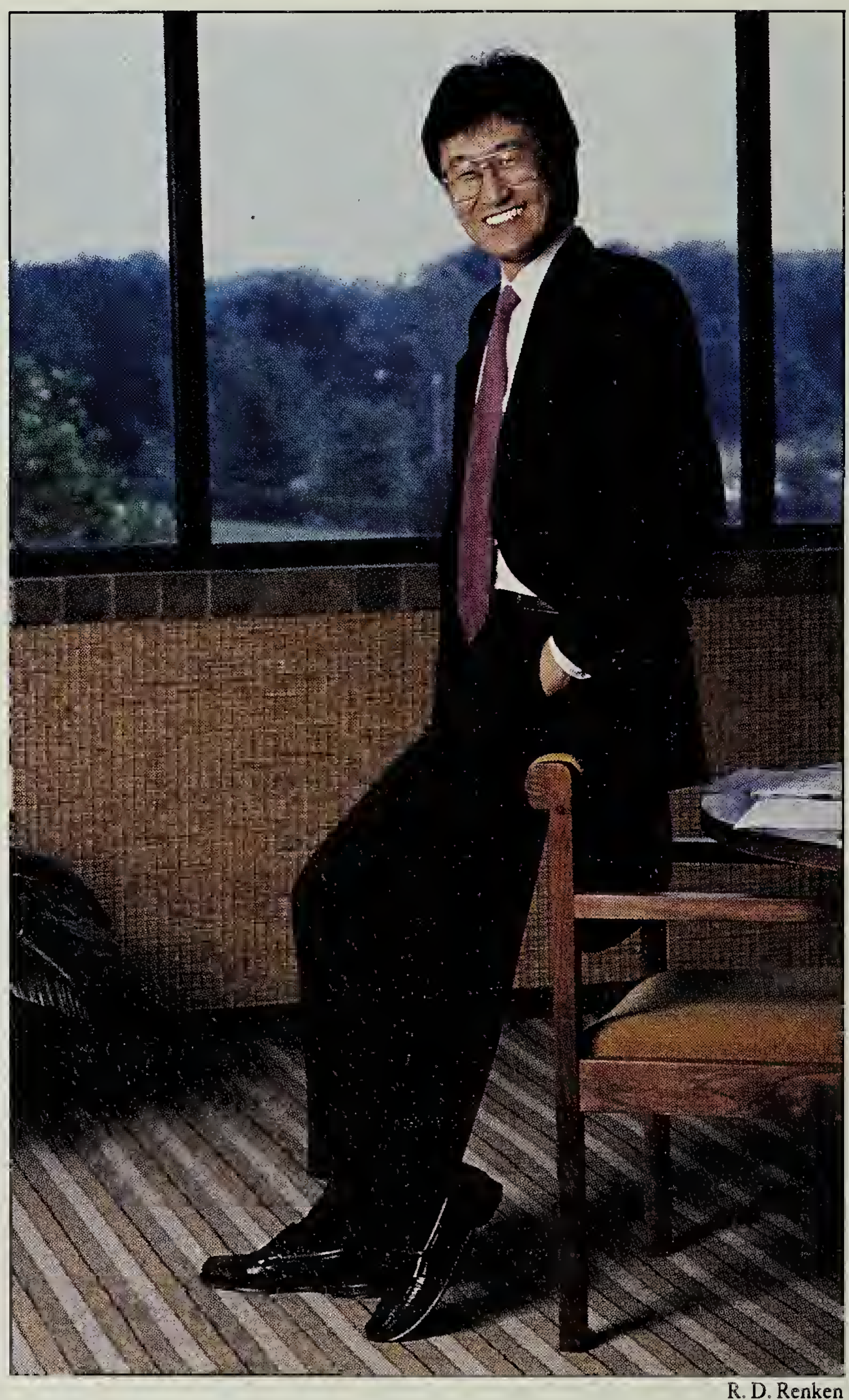
General Dynamics Corp. is doing a good job of staying out of trouble. Unlike its competitors, which are struggling with contracts, cost overruns and uncertain congressional support, the St. Louis-based aerospace company enjoys secure long-term agreements.

"General Dynamics has been very successful at landing a number of programs important enough to be continued at a reasonably high level of production," says Paul H. Nisbet, who follows the industry for Prudential-Bache Securities, Inc. in New York.

Information systems have been vital to the company's success in the manufacture of such products as nuclear submarines, F-16 fighters, M-1 tanks and missiles. For example, the production of the F-16 — which now accounts for about 35% of the company's sales and 50% of earnings — has been highly automated since the 1970s. The jet fighter's development relies heavily on electronic design and manufacturing systems.

"The F-16 is one of the most automated production programs under the Department of Defense," Nisbet says.

The company's commitment to IS caused it to rank first among aerospace companies in this year's *Computerworld Premier 100,* outscoring last year's leader, Northrop Corp., which placed second in the category this year.



R. D. Renken

General Dynamics' IS *group chooses not to rest on its laurels under director Ken Wang, splitting into two parts to address user and corporate needs*

Despite its success, General Dynamics' IS organization is refocusing its efforts from supporting specific company products to what IS Director Ken Wang calls process management. The Data Systems Division (DSD) was split into two new groups 18 months ago — one to work more closely with users and another to provide corporatewide services. The split is aimed at consolidating IS support, reducing costs and developing ways to shorten design and production lead times.

This new emphasis on redesigning processes to meet user needs comes as company officials acknowledge a new U.S. defense climate of reduced government spending, greater scrutiny of contracts by Congress and serious disarmament negotiations with the Soviet Union.

"We used to manage and design the product, whether [they were] weapon systems or information systems," Wang says. "Now our focus is on life-cycle improvements versus lowest cost at the time of the decision. Improvements across General Dynamics are more important than local opportunities."

With an estimated $550 million budget, the Data Systems Division manages centralized IS facilities and works closely with groups running engineering systems within the different business divisions. These days, there is much greater emphasis on coordination among the

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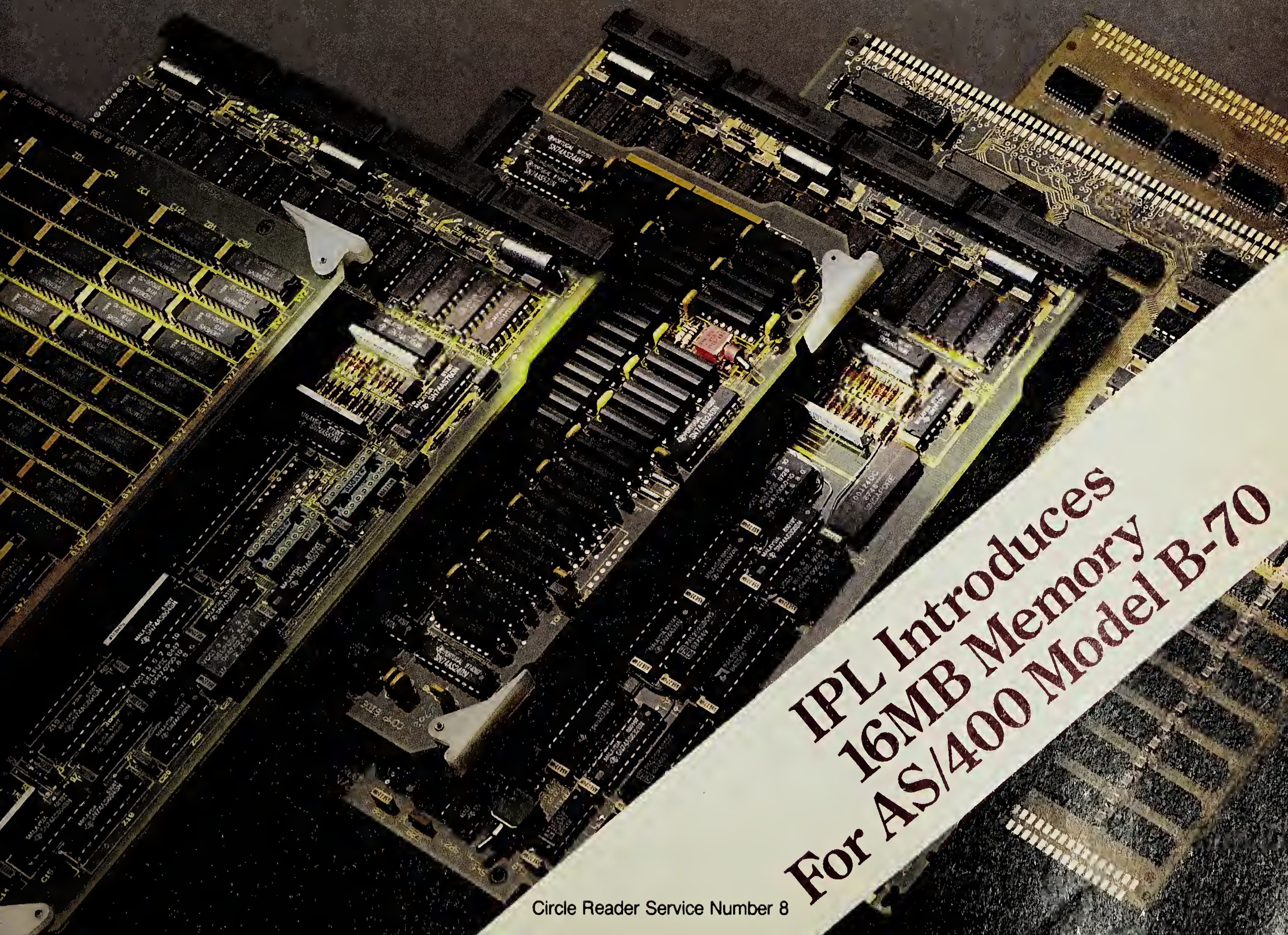

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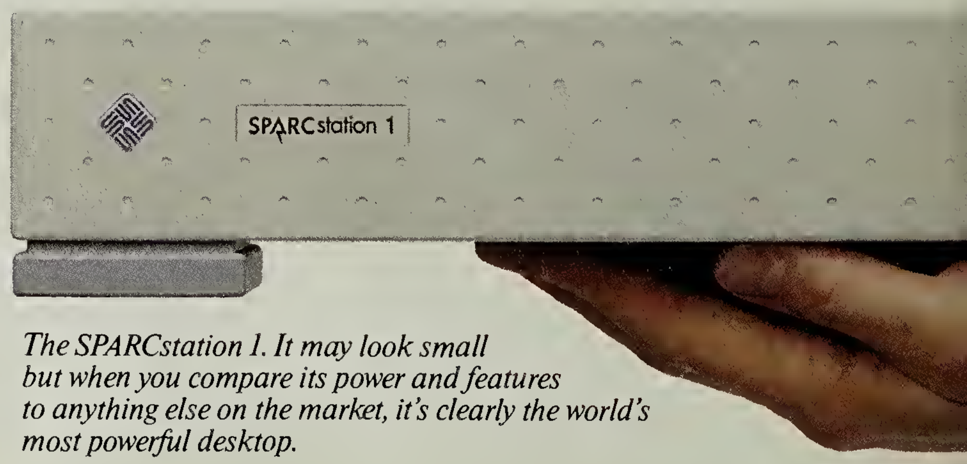

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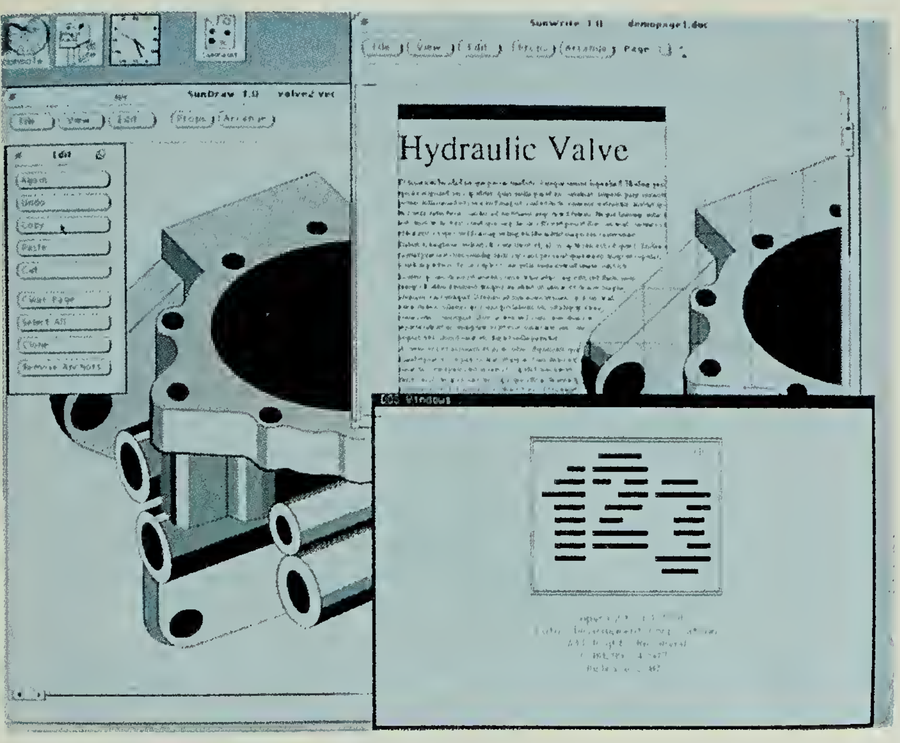

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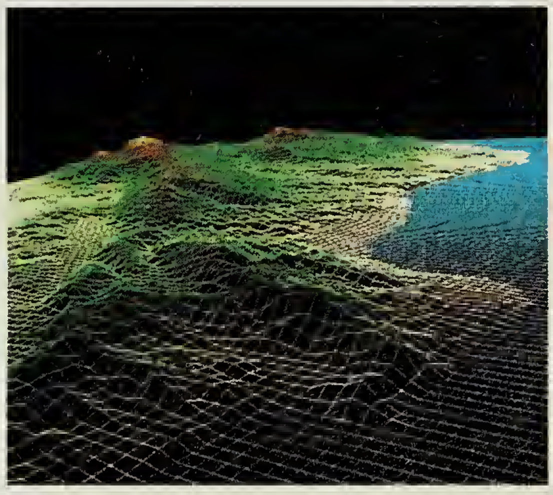

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various IS groups. In the past, the company had experienced problems with overly autonomous IS operations. The divisional groups might purchase unique hardware or software systems that solved short-term needs but did not connect with other systems or could not be upgraded.

Now the emphasis is on systems connectivity and longer useful life. This approach places more emphasis on managing design databases and design analysis than on specific processors or application packages. It also takes the focus off acquiring the latest technologies.

"We go after state-of-the-market tools as opposed to state of the art," Wang says. "We're a high-tech engineering company, but we're being more conservative, more prudent."

To bolster its drive for flexibility, General Dynamics has embraced a multivendor policy on hardware. "We try to have two competing suppliers," Wang says. "We've made a conscious decision not to put all our eggs in one basket." For example, at the Fort Worth, Texas, data center, where a Cray Research, Inc. X/MP-24 is already running, General Dynamics recently upgraded its phalanx of IBM mainframes with one from Amdahl Corp.

The emphasis on overall connectivity causes a more careful review of make-vs.-buy decisions on software, communications and other IS services. Applications will be written in-house only when there is a clear advantage to the firm, Wang says.

Aerospace

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Industry rank	Company Location Total employees	Premier 100 rank	Total score	Total revenue (millions)	1988 profits (millions)	Estimated IS budget (millions)
1	**General Dynamics Corp.** St. Louis, MO 104,100	6	28,500	$9,551	$379	$550
2	**Northrop Corp.** Hawthorne, CA 46,400	12	27,740	$5,797	$104	$380
3	**Gencorp, Inc.*** Akron, OH 14,900	13	27,605	$1,891	$67	$40
4	**Lockheed Corp.** Calabasas, CA 93,100	18	26,985	$10,590	$624	$450
5	**Grumman Corp.** Bethpage, NY 32,900	20	26,880	$3,591	$87	$253
6	**McDonnell Douglas Corp.** St. Louis, MO 116,900	29	26,325	$15,072	$350	$786
7	**United Technologies Corp.** Hartford, CT 188,400	34	26,135	$18,087	$659	$814
8	**Textron, Inc.** Providence, RI 60,500	38	25,865	$7,286	$272	$235
9	**Rockwell Int'l Corp.** Seal Beach, CA 114,200	42	25,650	$12,135	$779	$440
10	**The Boeing Co.** Seattle, WA 147,300	67	24,820	$16,962	$614	$1,000

THE NEXT PHASE

Wang — who had 12 years' experience in General Dynamics' San Diego engineering group before taking on the Data Systems Division management assignment — is managing the acquisition of a new corporatewide data network to replace the current satellite system.

A key to General Dynamics' new strategy, this network will facilitate the more flexible distribution of large amounts of data between locations than is currently allowed by the satellite and expensive earth stations. Wang's staff is evaluating proposals from vendors for the first phase of the network's design and installation. The vendor may be selected by the end of the year, which means that the system would be operational by July 1990. The new system will likely include a backbone of T1 and T3 lines linked via gateways to local-area networks within departments.

"There's nothing wrong with the satellite network, but because of competitive pressures, we have to be able to move more data faster," Wang says.

Day-to-day computer decisions at General Dynamics are made by two groups in consultation: Each division has its own information resource management professionals who plan, analyze and propose needed systems. Arbitrating contention between groups is the Data Systems Division.

The DSD emphasizes training programs for approximately 4,600 employees, keeping a corporate commitment to provide workers with at least 40 hours of training per year. Wang attributes this emphasis on training and employee development to a turnover rate for IS workers that is in the single digits, even in highly competitive regions of the country.

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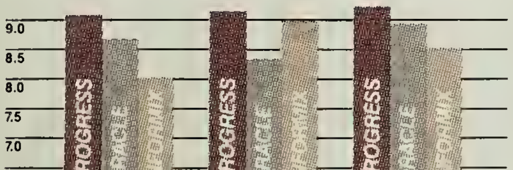

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Circle Reader Service Number 10

Don't Save a Seat: Baxter Healthcare Doesn't Settle for the Leading Edge

By Clinton Wilder

After a conversation with Michael S. Heschel, Baxter Healthcare Corp.'s corporate vice-president of information resources, you may not be sure what year you're living in. Heschel is so future-oriented, aiming at late-1991 implementations of various technologies and the like, that it can be hard for a listener to keep up with him.

That kind of forward vision is absolutely critical when you are part of a company that already has a strong reputation in the effective use of information systems. Baxter, through its 1985 merger with American Hospital Supply Corp. (AHS), acquired the ASAP customer on-line order network, a system perennially cited as a leading example of the use of IS for competitive advantage.

David Kogan

Baxter Healthcare's Heschel *focuses on the future*

But Baxter became the *Computerworld Premier 100's* No. 1 IS user in equipment and materials manufacturing not by sitting on its laurels but by moving ahead. Enhancements to ASAP are only the beginning.

"The real key to Baxter's success is that they've continued to expand and migrate the technology," says Victor Janulaitis, a consultant whose Los Angeles-based firm, Positive Support Review, has worked closely with Baxter. "There are no giant leaps of technology, just gentle nudges to stay ahead of the pack."

Baxter identifies three areas, Heschel says, in which it concentrates information technology efforts:

- Make as much data as possible available throughout the $6.8 billion corporation.
- Implement leading-edge manufacturing technology.
- Push the computing function out into the business units and down to the most feasible functional level.

"We're trying to drive the processing as close to the person making the business decision as we can," Heschel says. "We have to do that to get costs down and reduce product lead time, eliminate layers of bureaucracy that aren't necessary and reassign those people to more productive areas."

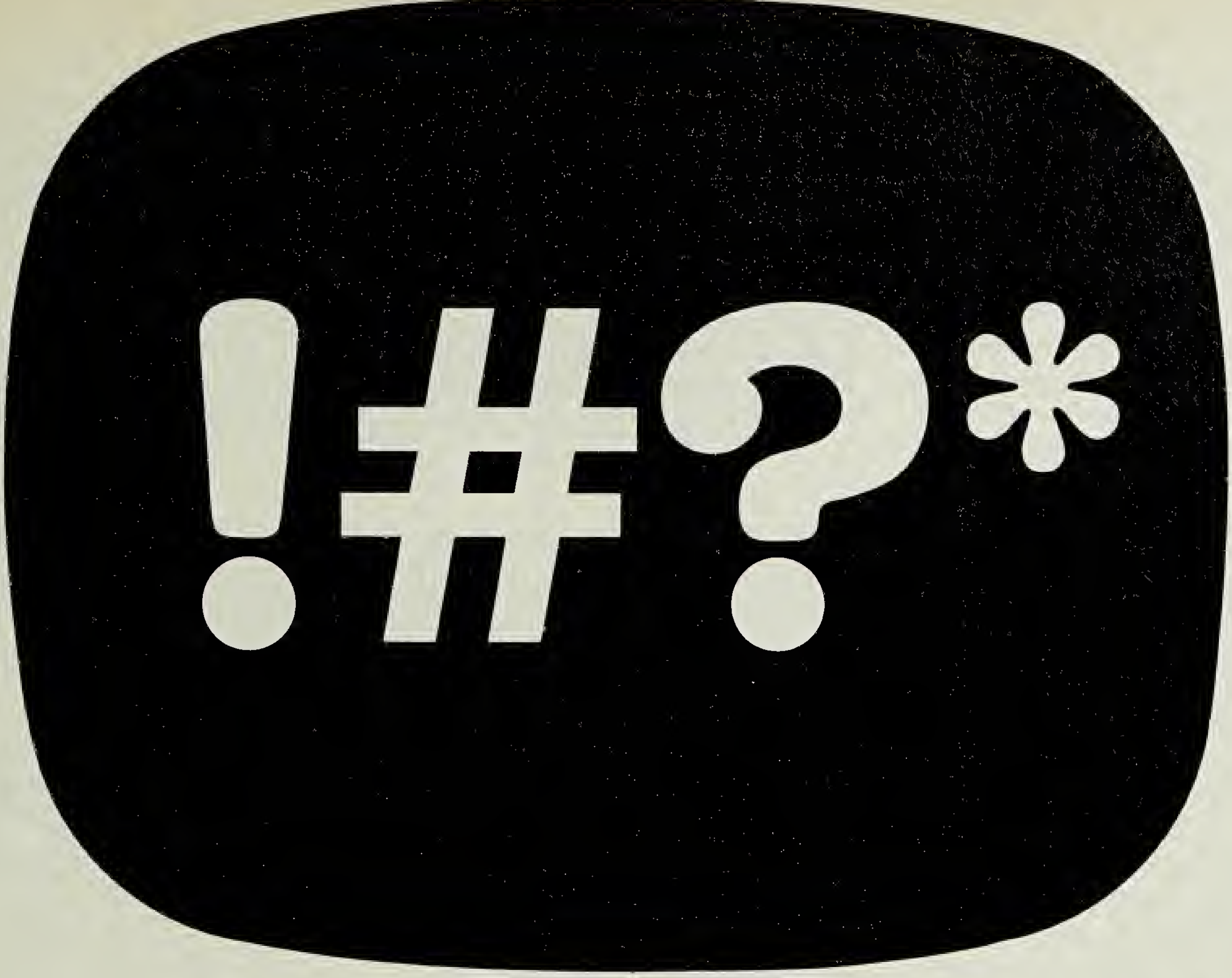
Baxter increased its population of terminals, personal computers and workstations by a whopping 44% in 1989 to 36,000, including 6,000 microcomputer-based systems that replaced terminals.

But the hardware platforms are only the means to an end. Baxter's goal for the first quarter of 1991 is to provide users with a single order processing and distribution system, called Online Express. The Baxter and former AHS operations currently run two different order processing systems. "We want to make Baxter look like one Baxter," Heschel says.

In the competitive medical products industry, time to market is a critical success factor. Observers give Baxter high marks for streamlining that process with technology links among manufacturing, marketing and distribution functions.

"They have the most efficient distribution systems and use it to their advantage," says Jerry Fuller, medical industry analyst at Chicago-based Duff & Phelps, Inc.

As an example, Janulaitis points to the way Baxter can respond to a



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Circle Reader Service Number 11

customer order for a product that is out of stock in the distribution center. A system of search-and-seek rules can find the product at an earlier stage of the manufacturing cycle; then, a manager decides if it is feasible to speed up production.

"They can pull the product off the factory floor, or they'll ship a competitor's product to fill the order," Janulaitis says. "Their business is intricately linked with technology."

To Heschel, however, enough is never enough. ASAP, for example, is in the process of a major facelift, migrating from dumb terminals to Intel Corp. 80286-based PCs. Five hundred of the 7,000 ASAP terminals in hospitals and other customer sites will be switched to PCs by the end of this year. The PCs run ASAP Express, an enhanced application allowing customers to access records of their own purchasing and product-use patterns.

For Baxter's top 100 executives,

Equipment & Materials Manufacturing

COMPANIES ARE RANKED BY INDUSTRY ACCORDING TO CW 100 INDEX.
*ESTIMATES ARE FROM *COMPUTERWORLD* SOURCES, NOT THE COMPANY.

Industry rank	Company Location Total employees	Premier 100 rank	Total score	Total revenue (millions)	1988 profits (millions)	Estimated IS budget (millions)
1	**Baxter Healthcare Corp.** Deerfield, IL 62,800	8	28,075	$6,861	$388	$250
2	**3M Co.** St. Paul, MN 82,700	24	26,645	$10,581	$1,154	$517
3	**Great Northern Nekoosa*** Stamford, CT 19,600	40	25,745	$3,588	$347	$43
4	**Nortek, Inc.*** Providence, RI 10,651	53	25,205	$1,425	$20	$17
5	**Becton Dickinson & Co.*** Franklin Lakes, NJ 20,300	54	25,175	$1,749	$165	$34

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including Chairman Vernon R. Loucks Jr., the information resources department developed PC Express, a user-friendly application for analyzing the company's financial status. “We used a lot of cycles on the front end to remove ‘terminal shock,’” Heschel says.

Heschel attributes much of Baxter's success to continual reassessment of technology and the business. “Once you know who you are and what you want to be when you grow up, you can do a real assessment of IS capabilities,” he says.

Baxter's next IS frontier is extensive networking of its overseas operations — which account for about 20% of revenue — with corporate headquarters. That is the kind of long-range plan that Heschel likes.

Part of his ability to focus on the future stems from his position as a member of Baxter's operating committee, a corporate status enjoyed by few IS executives. On the committee, long-range IS planning is done side by side with business planning.

“Baxter knows that just because you're a winner today doesn't mean you will be in five years,” Janulaitis says. “They're making sure they have something left after Heschel retires and the organization changes.”

Industry rank	**Company** Location Total employees	Premier 100 rank	Total score	Total revenue (millions)	1988 profits (millions)	Estimated IS budget (millions)
6	**The Mead Corp.*** Dayton, OH 20,800	58	25,120	$4,464	$353	$50
7	**Temple-Inland, Inc.*** Diboll, TX 11,000	59	25,100	$2,099	$199	$25
8	**North Amer. Philips Corp.*** New York, NY 50,500	62	24,966	$5,424	$79	$116
9	**Owens-Corning Fiberglas** Toledo, OH 17,600	63	24,965	$2,831	$197	$43
10	**Burlington Holdings, Inc.** Greensboro, NC 7,000	64	24,890	$2,167	$72	$35

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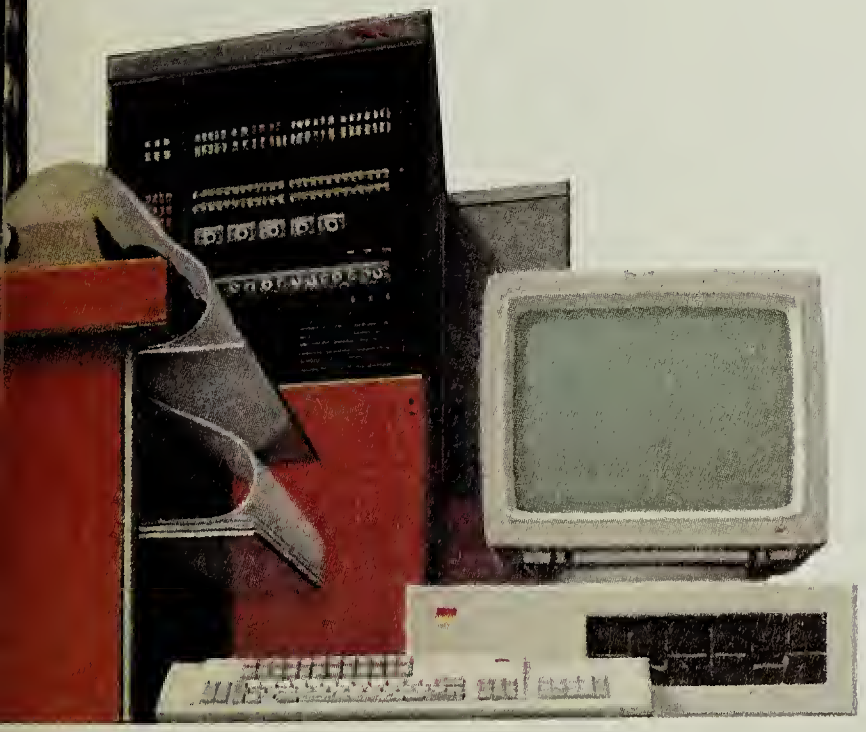

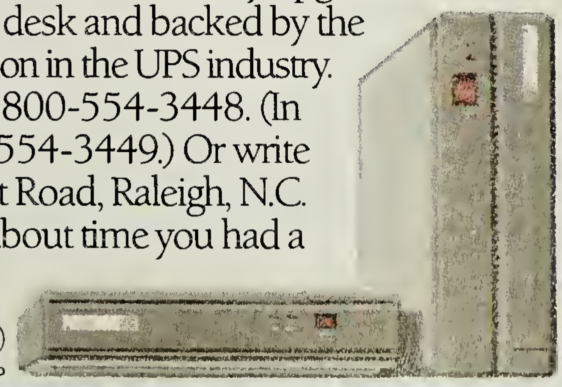

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Gillette Slips Takeover Tries with Razor-Sharp Systems Edge

……………………

By Alan Radding

Frank Siteman

Moller joined Gillette *during its new information systems initiatives*

After two close shaves with hostile takeover attempts, Gillette Co. is finally celebrating some good news.

In July, the company announced the selection of Herbert Moller, a career financial executive then with the corporation's Braun AG subsidiary in West Germany, as corporate vice-president and director of information systems.

Moller, who oversaw IS at Braun as its chief financial officer, succeeds Kavin Moody, who left Gillette in June 1988. Professing that he is not an information systems professional, Moller says his role will be "to serve as a link between IS and the line managers."

Moller's arrival coincides with key information systems initiatives that have helped Gillette rank at the top of the consumer products industry in this year's *Computerworld Premier 100.*

IS has been deeply involved in supporting Gillette's new razor product, Flag, which has been the subject of considerable speculation and is expected to be introduced this fall.

The IS group acquired and customized new manufacturing resources planning packages for both the machine shop where the production tools are designed and built and on the factory floor. It has developed additional CAD/CAM applications and dedicated a Digital Equipment Corp. VAX to the project. The new systems will be applied throughout the shaving products division.

Other recent programs include a sales information system, a worldwide electronic mail network, utilization of new market research databases and downsizing of systems from mainframes to personal computer networks.

To support these efforts, Gillette spends $96 million annually, or about 2.7% of its revenue. Another $80 million accounts for the market value of the firm's installed equipment.

The corporate IS department, located in Boston, runs a headquarters data center and manages domestic operations for the three chief product groups — shaving devices, other personal care items and stationery products. The bulk of the information processing is distributed throughout the worldwide organization.

HIGHS AND LOWS

Gillette is bounding back from the dark days of 1986 and '87, when it paid greenmail as it fought off corporate raiders and subsequently cut personnel, including the IS staff, about 8%. Last year, sales rose 13% to $3.6 billion while net income climbed 17% to $268 million.

"Gillette is setting all-time highs," says Harry E. Wells, director of research at securities firm Adams Harkness & Hill in Boston. "The company has come through [the takeover attempts] with flying colors."

One of the reasons for Gillette's current success is the new sales system, which allows managers in the field to quickly access information on customers and the performance of salespeople rather than waiting for the traditional end-of-the-month report.

"The managers wanted to take a more active approach toward information," says Joseph Cloonan, the controller of Gillette's corporate

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2. **TITLE/FUNCTION** (Circle one)

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   - **19.** Vice President, Asst. VP
   - **21.** Dir., Mgr., Suprv., IS/MIS/DP Services
   - **22.** Dir., Mgr., Suprv., of Operations, Planning, Adm. Services
   - **23.** Dir., Mgr., Suprv., Analyst, of Systems
   - **31.** Dir., Mgr., Suprv., of Programming
   - **32.** Programmer, Methods Analyst
   - **35.** Dir., Mgr., Suprv., OA/WP
   - **38.** Data Comm. Network/Systems Mgt

   OTHER COMPANY MANAGEMENT
   - **11.** President, Owner/Partner, General Mgr
   - **12.** Vice President/Asst. VP
   - **13.** Treasurer, Controller, Financial Officer
   - **41.** Engineering, Scientific, R&D, Tech. Mgt
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   - **B.** Minicomputers/Small Business Computers
   - **C.** Microcomputers/Desktops
   - **D.** Communications Systems
   - **E.** Office Automation Systems
   - **F.** No Computer Involvement

   OTHER PROFESSIONALS
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information systems organization.

A global E-mail system, which was completed this year, runs on General Electric Information Services' public network and supports Gillette's efforts to tie its systems together throughout the world. The network provides any Gillette worker who has access to a PC with the ability to communicate with any other worker, regardless of location, Cloonan says.

> *Although the rocky financial times are apparently over, two obstacles still face Gillette's IS group: It must control decentralized systems, particularly LANs, and continue to work within tight budget constraints.*

The global communication system also lets Gillette users throughout the world access applications anywhere in Gillette systems, Cloonan says. The project got under way in 1988 and will be completed this year.

Gillette also recently acquired a market research database package that enables marketing managers to keep tabs on competitive products. The system provides the managers with better access to and analysis of the voluminous amounts of syndicated data available.

Gillette has taken a pioneering role in moving applications from mainframes to PC-based local-area networks. The company has moved more than 50 applications from large systems to PC-based networks. For example, the IS staff provided a LAN for a central database application containing all account information used by the credit analysis group. The LAN provides "a central point of information on all accounts," Cloonan says.

LANs are a major growth area for Gillette worldwide as well as an important focus for its distributed information resource groups, particularly in manufacturing operations in smaller plants.

LANs offer price/performance advantages over other systems such as IBM's Application System/400, the more conventional replacement for IBM's System/34, 36 and 38 processors, Cloonan says.

HURDLES

Although the rocky financial times are apparently over, two obstacles still face Gillette's IS group: It must control decentralized systems, particularly LANs, and continue to work within tight budget constraints.

"We have to ensure that there is control and integration," Cloonan says. Despite increased corporate profits, budget growth is merely keeping pace with inflation, and "the 1990 budget decisions are even harder than in previous years," he says. "We're being asked for more systems, more applications and more networks."

Gillette's corporate IS group researches new technologies, but tight budgets in recent years have forced it to prioritize its activities and zero in on technologies that promise a relatively swift payback.

For example, the company is

Consumer Products

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1	**Gillette Co.** Boston, MA 29,900	10	27,925	$3,581	$269	$96
2	**Polaroid Corp.** Cambridge, MA 12,300	31	26,285	$1,863	($23)	$61
3	**McGraw-Hill, Inc.*** New York, NY 16,100	36	25,995	$1,818	$186	$125
4	**Macmillan Publishing Co.** New York, NY 9,400	37	25,870	$1,019	$49	$90
5	**Berkshire Hathaway, Inc.*** Omaha, NE 20,000	52	25,305	$2,333	$399	$50
6	**Masco Corp.*** Taylor, MI 27,000	65	24,875	$2,439	$288	$29
7	**Warner Communications*** New York, NY 14,000	80	24,425	$4,206	$423	$90
8	**Eastman Kodak Co.*** Rochester, NY 134,900	112	23,590	$17,034	$1,397	$266
9	**The Leslie Fay Cos.*** Wilkes-Barre, PA 3,500	129	23,295	$683	$22	$8
10	**Mohasco Corp.*** Fairfax, VA 6,424	174	22,310	$791	($18)	$9

David Leifer

Gillette's Cloonan, *controller of corporate information systems*

looking at image processing. "We are studying image processing to see if there is an immediate return on the investment," Cloonan says.

Initial indications are that there are good opportunities but that the technology is still too costly. "It is not like picking up a couple of PS/2s," he adds. Expert systems will remain on the back burner for now, although down the road, Cloonan says they can benefit Gillette.

Despite Gillette's financial worries and tight budgets, Moller is confident that the company will continue to invest in systems, although the investments will be selective.

"The company hasn't been shy in investing in areas where it saw a good return for the business lines," he says. "If a business unit or IS generates a sound idea, the company will follow through [with the money]."

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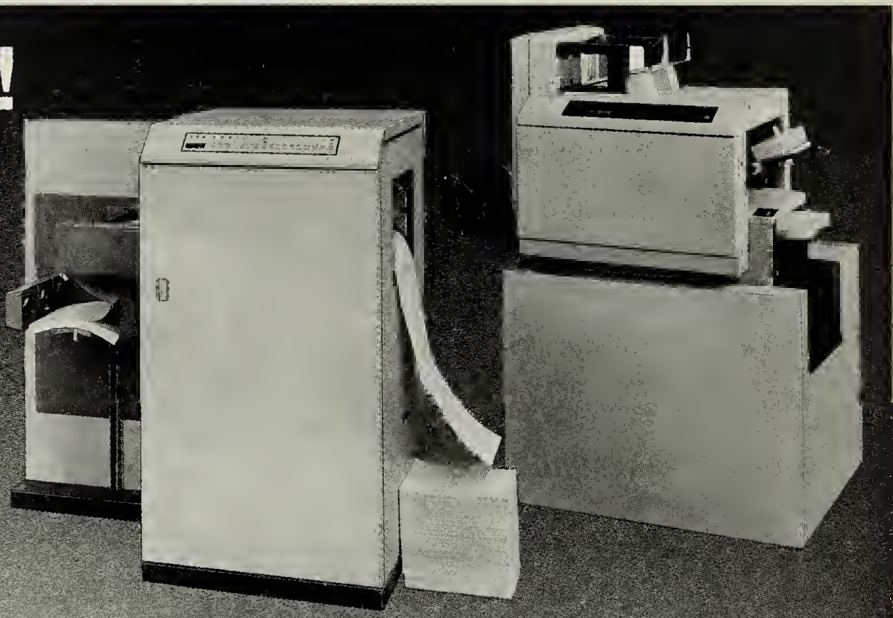

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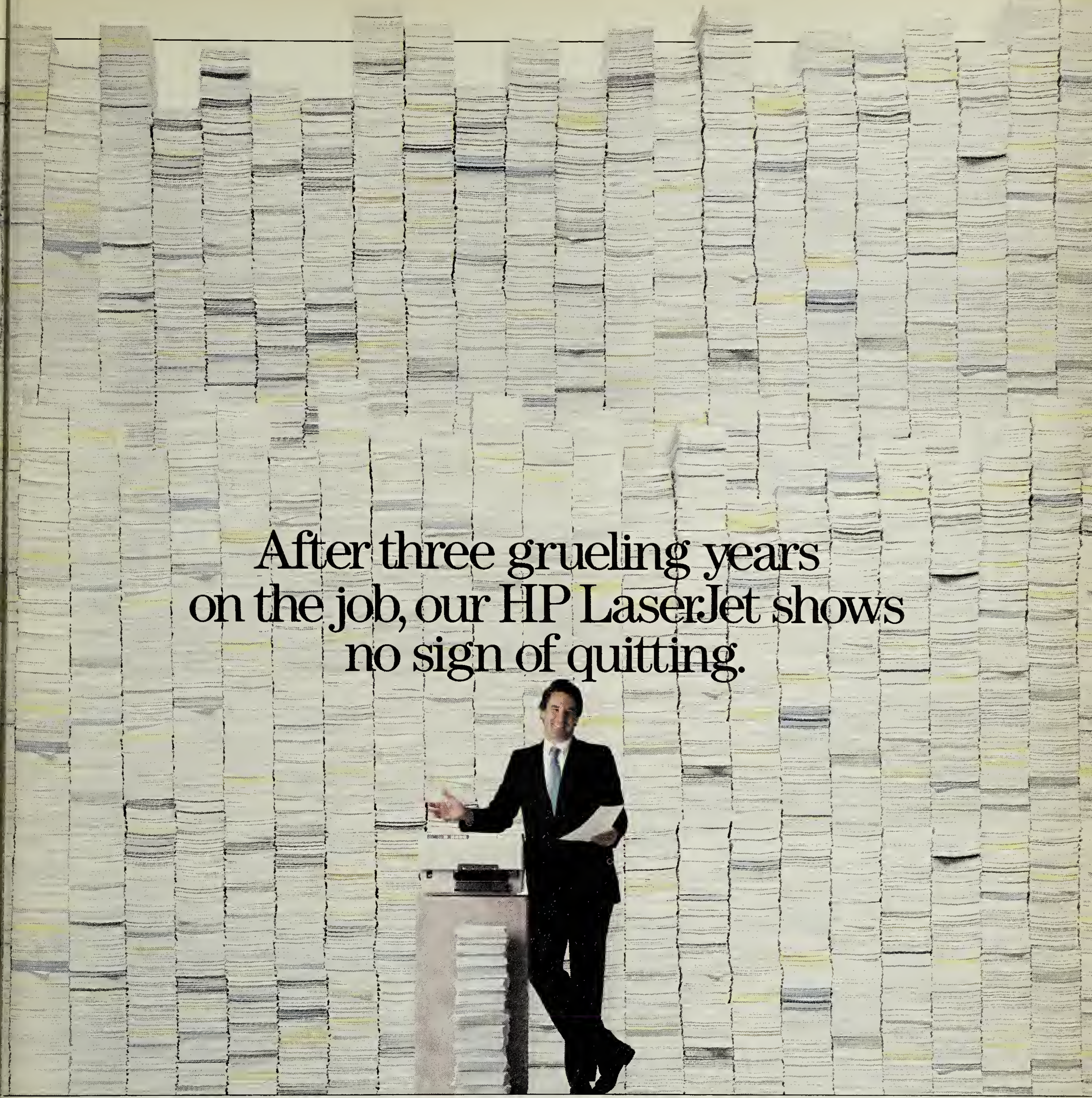
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Circle Reader Service Number 14

Unified Business Focus Drives American Express' Diversified Success

By Michael L. Sullivan-Trainor

In the midst of stiff competition in financial services, American Express Co. stands apart. Rather than follow the pack, the company has staked out a clear market focus and applied technology to differentiate itself from other firms.

"American Express charges a premium price to merchants and card members, and they have to justify that through superior customer service. They provide that service through the use of information technology," says Thomas J. Martin, vice-president at Arthur D. Little's Artificial Intelligence Center in Cambridge, Mass.

The company spends an estimated $1 billion annually — more than 4% of revenue — on information systems, yet staff costs are lower than the norm, with only 23% of the IS budget used for personnel. These figures, among others, give American Express its rank of 25th in this year's *Computerworld Premier 100* and No. 1 in its industry category.

By using technology to provide high-quality service, American Express maintains its upscale customer base, which helps it stay healthy when the economy is less robust.

"The company shows signs of being recession-resistant, partly due to its target high-income market," says analyst Stephen Biggar at Argus Research Co. in New York.

American Express' use of technology is driven by two key concepts. Structurally, it combines corporatewide ventures with decentralized business units that operate autonomously. The ventures provide economies of scale, particularly in volume equipment purchases and technology research and development. The second force is the company's dedication to applying advanced technology when there is a clear payoff.

"Our focus in advanced technology — which we define as anything too risky for routine deployment — is to look at projects that are either visible to the customer, such as improving service or offering a new product, or ones that offer very large cost displacements," says Roy Lowrance, vice-president of technology and strategy.

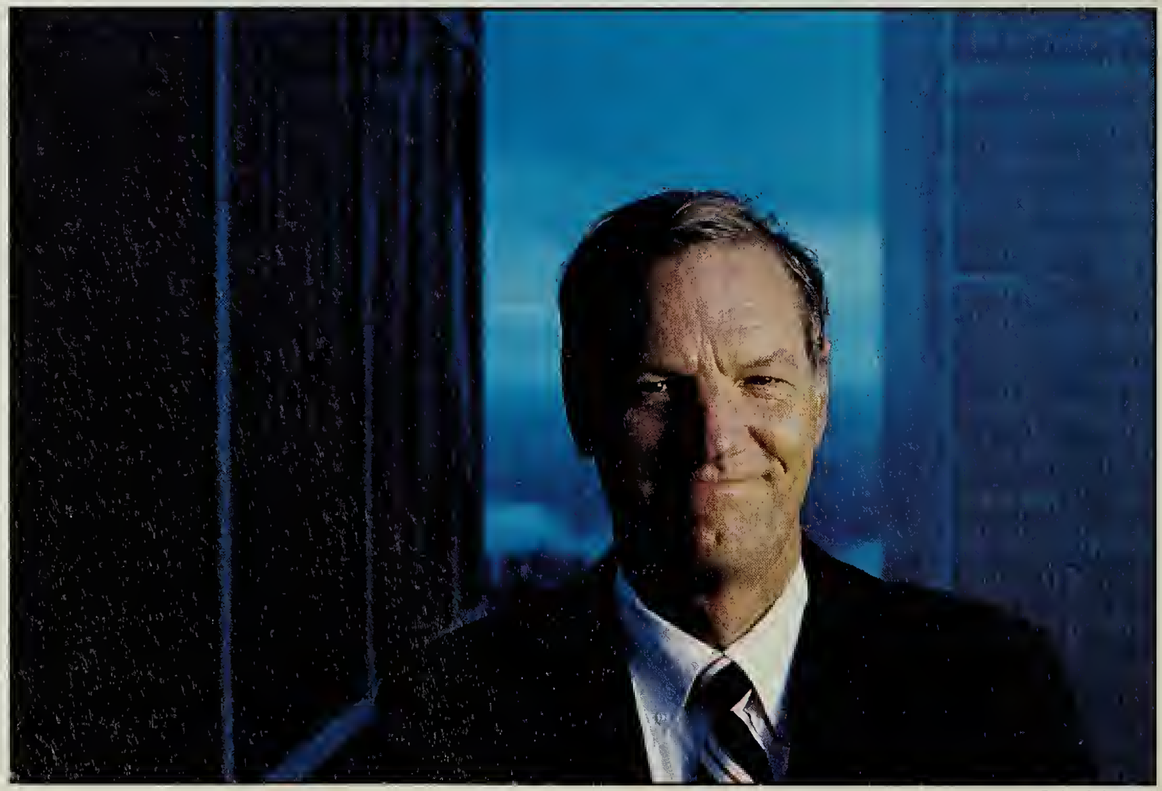
WATCHING OVER

Lowrance manages a corporate-level research and development program and heads a team of nine IS staff members, who act as consultants to IS operations in each of American Express' five business units. Each unit has its own IS executive. In addition to evaluating vendors and technologies, the corporate group organizes quarterly meetings of a Business Unit Systems Executive Committee composed of the units' IS executives.

The five units are Travel Related Services Co. (TRS), IDS Financial Corp., Shearson Lehman Hutton, Inc., American Express Bank Ltd. and a newly formed IS products subsidiary, American Express Information Services Co.

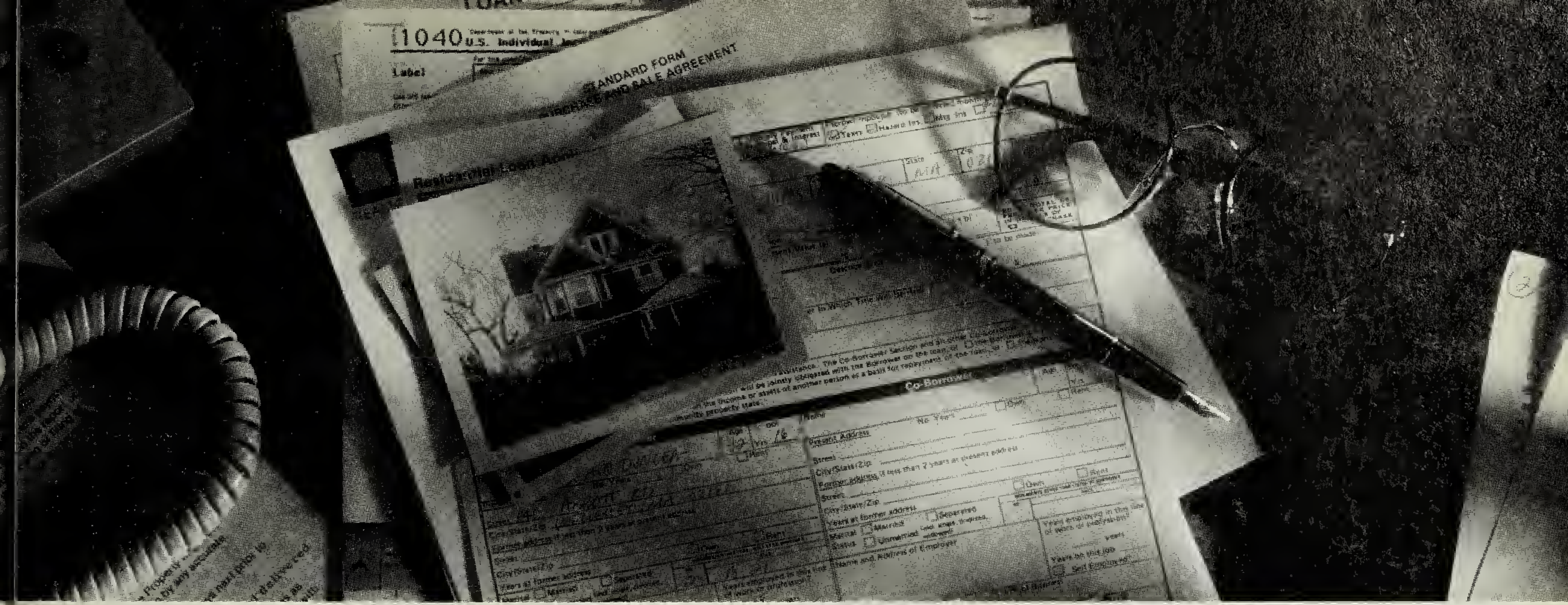
Until recently, American Express President Louis V. Gerstner Jr. was the driving force behind the company's IS strategy, particularly in the advanced technology area. When Gerstner resigned in March to head RJR Nabisco, American Express Chairman and CEO James D. Robinson III took over in the position of acting president.

"When Gerstner left, we all asked the same question: Is it over for technology?" Lowrance says. "But Robinson came in and told us to take everything Gerstner was doing and



John Martini

Cupp's department *helped generate 32% of the firm's $23 billion revenue*



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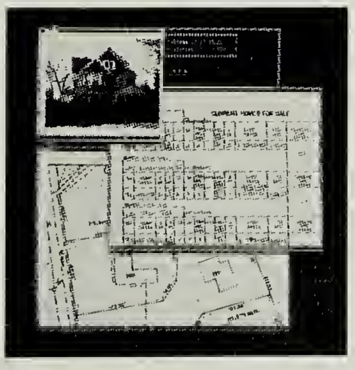

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double it. He has followed through on that."

The information systems operation for TRS, the largest business unit, is run by Executive Vice-President Garland Cupp. This division, which handles credit-card transactions, was responsible for 32% of the company's $23 billion revenue and earned 70% of its $1.04 billion in profits. Last year, the division processed transactions for 30.7 million credit cards.

Keeping up with the volume is a demanding part of TRS' job. CPU capacity has grown more than 30% per year in the past five years.

To help maintain responsiveness in the credit authorization application, TRS is installing a series of Stratus Computer, Inc. distributed processors throughout its worldwide network.

"Our core system is host-based here in Phoenix, and coupled with our network, it provides good availability. But the name of the game is 100% availability. So we're installing remote processors," says Ken Chrisman, vice-president of architecture, technology and data management at TRS.

The processors will be interlinked with TRS' network and the networks of large service establishments such as hotels and airlines.

Financial Services & Insurance

COMPANIES ARE RANKED BY INDUSTRY ACCORDING TO CW 100 INDEX.
*ESTIMATES ARE FROM *COMPUTERWORLD* SOURCES, NOT THE COMPANY.

Industry rank	**Company** Location Total employees	Premier 100 rank	Total score	Total revenue (millions)	1988 profits (millions)	Estimated IS budget (millions)
1	**American Express Co.** New York, NY 92,200	25	26,610	$22,934	$1,039	$1,000
2	**Farmers Group, Inc.** Los Angeles, CA 15,508	27	26,410	$1,191	$268	$57
3	**Nationwide Mutual Ins. Co.*** Columbus, OH 7,367	35	26,045	$2,082	$7	$130
4	**Northwestern Mutual Life*** Milwaukee, WI 8,648	47	25,535	$5,372	$48	$135
5	**Paine Webber Group, Inc.** New York, NY 13,000	48	25,520	$2,512	$42	$190
6	**Kemper Corp.*** Long Grove, IL 16,600	51	25,350	$3,135	$224	$107
7	**Fleet/Norstar Financial*** Providence, RI 19,100	89	24,155	$3,051	$336	$104
8	**USF&G Corp.** Baltimore, MD 11,200	118	23,500	$5,582	$232	$127
9	**Firemans Fund Corp.** San Raphael, CA 12,300	124	23,375	$3,704	$247	$147
10	**Continental Insurance Co.*** New York, NY 17,000	126	23,345	$5,878	$1	$160

TRS' other well-known technology initiatives include an image-processing application designed by TRW, Inc.'s Technicron Financial Services. It generates images of credit receipts for card holders and provides improved service and cost savings for the company.

Another initiative is an expert system called Authorizer's Assistant that helps agents evaluate credit applications, automatically providing account data and recommendations for action.

> ***By using technology to provide high-quality service, American Express maintains its upscale customer base, which helps it stay healthy when the economy is less robust.***

TRS is also engaged in an examination of what the company's business and technology needs will be five years from now. This future-oriented business plan, called the Genesis Project, includes further developments on the IS front.

"Part of the project would involve a more than $50 million investment in expert systems to improve customer service," Arthur D. Little's Martin says. "That kind of investment would put them ahead of the other financial services companies in applying expert systems."

The company would not confirm the extent of the Genesis investment in expert systems.

An early by-product of the Genesis effort is the spin-off of TRS' Data Base Services Group into its own company and the fifth business unit — American Express Information Services Co. The new company will sell IS products, including telemarketing services in a joint venture with AT&T.

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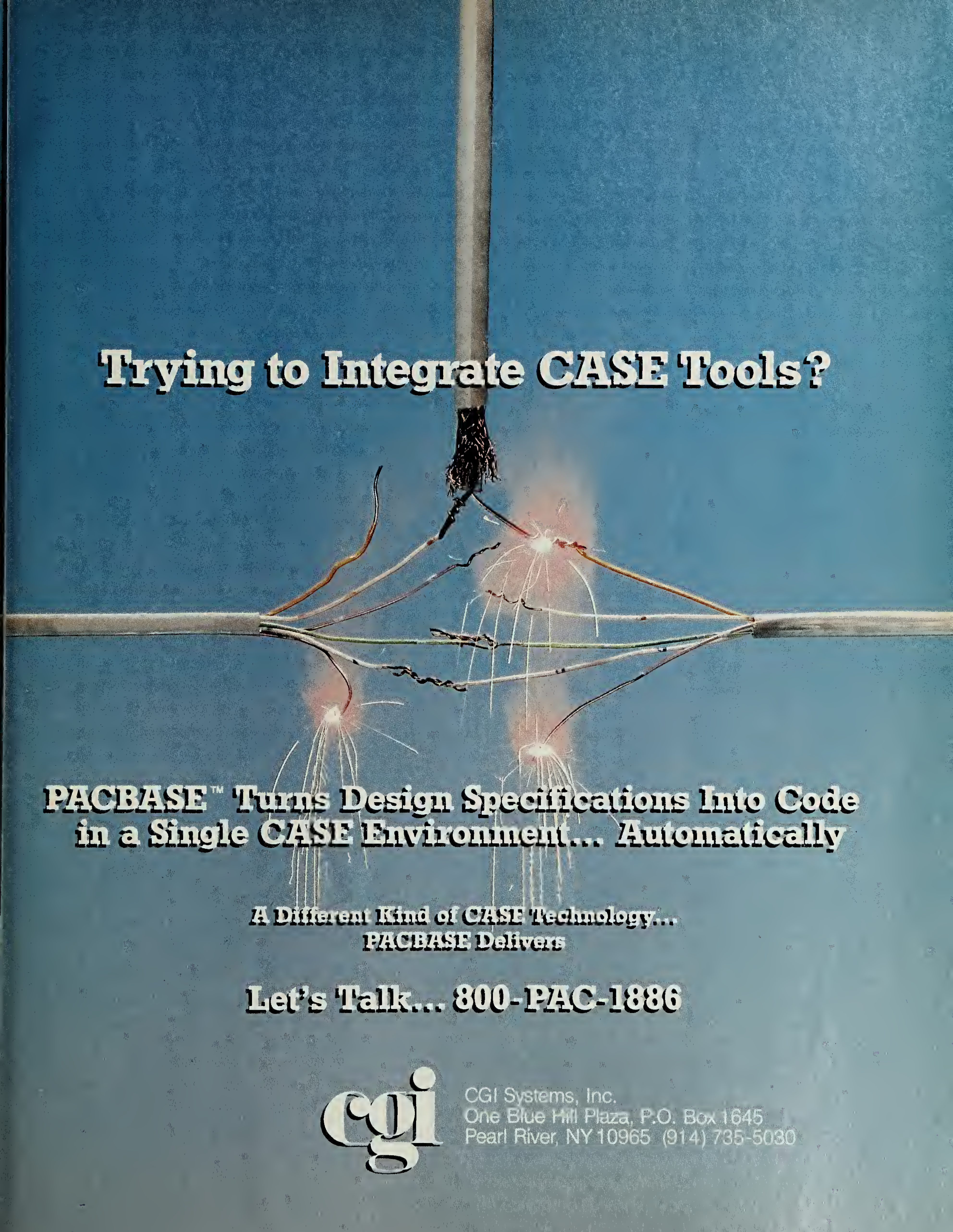

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Circle Reader Service Number 16

Dow Shakes Up Customer Service with Worldwide Integration Strategy

By William Brandel

Call it the year of the customer. As it repeats its performance as the *Computerworld Premier 100's* top-ranked chemical company, Dow Chemical Co.'s information systems strategy mixes data center consolidation and global systems integration with the goal of shaking up customer service.

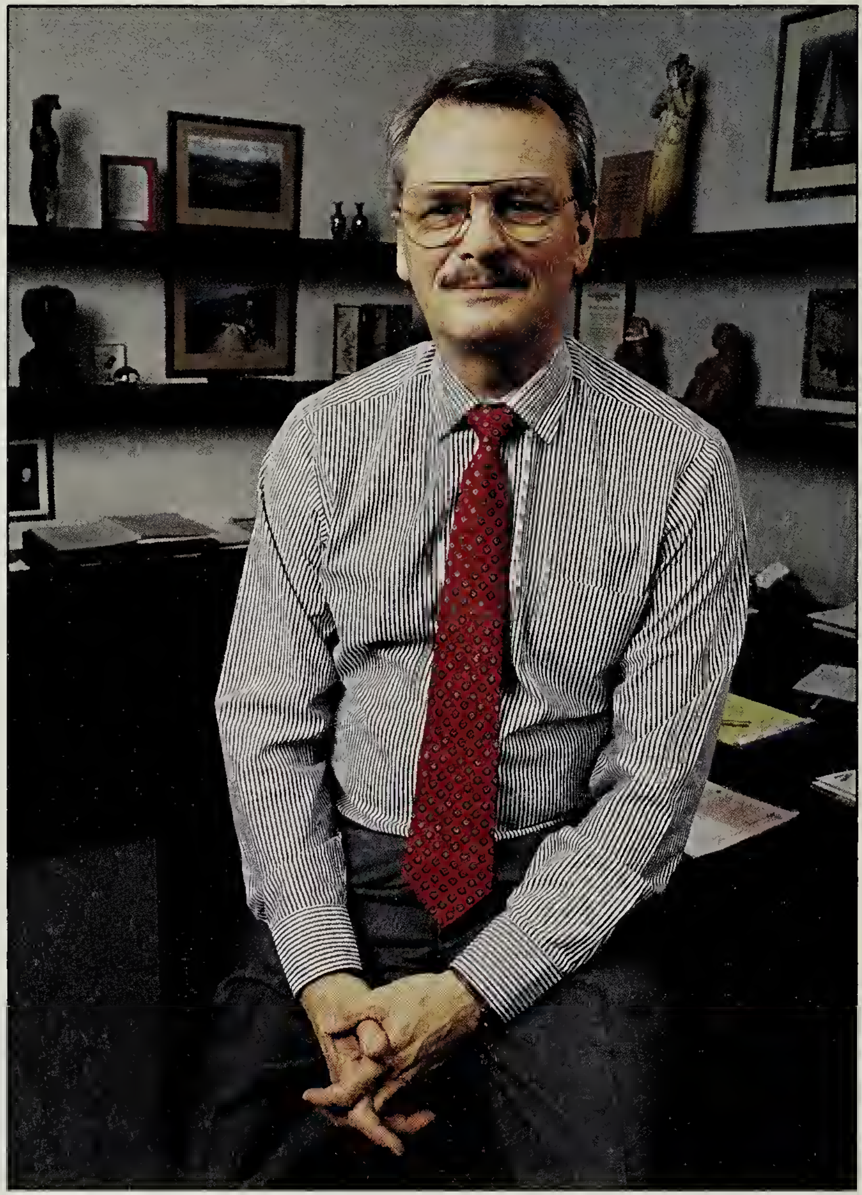
While chemical companies generally spend more on engineering and production systems than on business and administrative applications, global "customer satisfaction systems" are getting the biggest push at Dow.

The company is about to embark on a five-year program aimed at letting salespeople access relevant business information in any Dow database throughout the world.

The initiative is based on a three-pronged effort to simplify order entry, order management and inventory control applications running on IBM mainframes and accessible from desktop computers.

"Our ultimate objective is a high level of integration for our systems," says Hans Huppertz, Dow's vice-president of IS.

"Before, the customer had to talk to two different people to make the order, who would then have to talk to someone in inventory to see if the product was in stock and another in marketing to get a price quote. Now, one salesperson will be able to get the whole picture on one screen," he says.



Peter Yates/Picture Group

Dow's Huppertz *says data center consolidation gives his firm greater control over its global operations and generates immediate cost savings*

With this single-interface approach, combined with a worldwide network based on IBM's Systems Network Architecture and Token-Ring as well as Digital Equipment Corp.'s Decnet, a salesperson anywhere in the world will be able to learn what is available to him from any Dow facility, according to Huppertz.

The information is to be accessed from Apple Computer, Inc. Macintosh machines as well as IBM Personal Computers.

"You can't argue with success," says Huppertz, who has moved the Macintosh to standard status. "At this point, it is obvious that the Macintosh gives the scientific or technical user a lot more ease of use, and there is good productivity to be gained."

INAUGURAL SITE

Dow's Canadian Styrofoam business subsidiary will reportedly be the inaugural site for the integration undertaking, which is slated to begin next year.

Dow's IS strategy runs parallel in many ways to that of Du Pont Co. — its major rival — in Wilmington, Del., which landed in fourth place among chemical companies listed in the

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Circle Reader Service Number 17

Premier 100. Du Pont is in the process of installing a global network and has an international electronic mail system already in place.

In the past year, Dow has also consolidated three U.S. data centers into one and integrated two additional data centers in Brazil. Huppertz says data center consolidation gives his organization greater control over its global operations and generates immediate cost savings.

"We're saving on the cost of software, as each data center has to carry its own software license, and that is a high-priced commodity," he says.

The consolidation increases communications costs as users tap into remote processors via high-speed lines, but the benefits offset those expenses, Huppertz says.

STAFF CONSOLIDATION

Huppertz concedes that data center consolidation has led to personnel cuts. "Because of the hardware and software consolidation, the operators get consolidated as well," he said.

Until last year, Huppertz reported to Dow's vice-president of engineering and served dual roles as corporate liaison and U.S. director of IS operations. In October, he was promoted to vice-president of corporate IS and began reporting to the chief financial officer, reflecting a recognition at Dow of the strategic value of its global information systems.

"You can say I'm the glue that holds it all together," Huppertz says. "I make sure we aren't heading off in five different directions with research and development strategies and standards."

Huppertz, who has initiated a business systems manager council that places IS staffers in Dow business units, likes to hire MBA graduates and teach them technology.

He also encourages them to move up the ladder by seeing the world. With IS support on a global basis as the organization's highest priority, knowledge of Dow businesses and technologies in Canada, Europe, Latin America and Asia is imperative for ambitious managers.

Chemicals

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Industry rank	Company Location Total employees	Premier 100 rank	Total score	Total revenue (millions)	1988 profits (millions)	Estimated IS budget (millions)
1	**Dow Chemical Co.** Midland, MI 54,300	16	27,225	$16,682	$2,410	$315
2	**Monsanto Co.** St. Louis, MO 47,700	32	26,275	$8,239	$591	$168
3	**Freeport-McMoran, Inc.** New Orleans, LA 6,700	77	24,455	$1,945	$310	$28
4	**Du Pont Co.** Wilmington, DE 140,500	95	23,965	$32,514	$2,190	$1,000
5	**Himont, Inc.*** Wilmington, DE 3,200	105	23,745	$1,746	$375	$25
6	**W.R. Grace & Co.*** New York, NY 42,600	142	23,065	$5,786	$229	$90
7	**American Cyanamid Co.** Wayne, NJ 34,900	159	22,701	$4,592	$306	$106
8	**Sherwin-Williams Co.*** Cleveland, OH 16,300	173	22,311	$1,950	$101	$28
9	**Union Carbide Corp.*** Danbury, CT 43,600	176	22,275	$8,324	$662	$125
10	**Olin Corp.*** Stamford, CT 15,300	181	22,185	$2,308	$98	$34

> *"You can say I'm the glue that holds it all together. I make sure we aren't heading off in five different directions with research and development strategies and standards."*
>
> **— Hans Huppertz**
> **Dow Chemical**

A Dutch emigre who has traveled extensively himself, Huppertz sets the standard by spending more time traveling than in his office. "That's how it should be," he says.

Chuck Gibson, a vice-president at Index Group, Inc., a consulting firm in Cambridge, Mass., confirms the view of Dow's top executives interacting closely with IS in formulating strategy.

"An IS session is not a one-time classroom experience," he says. "In fact, the top 100 or so managers at Dow all interact with IS on a regular basis, at Huppertz's initiative and with the encouragement of executive management."

Brandel is a free-lance writer based in Boston.

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A Gamble and a Long-Term View Pay Off at Timken

By Michael L. Sullivan-Trainor

Jack Van Antwerp

Timken's *Fisher and Kost run systems operations with an eye toward the distant future*

Few executives would risk spending $500 million to build a computerized manufacturing facility when business is slowing down. Fewer still would consider such a large investment when the company's total revenue dipped below the billion-dollar mark.

However, the managers at Timken Co. did just that, erecting a world-class steel plant during a period when revenue dropped to $900 million from $1.4 billion. Their gamble was inspired by competition from Japanese companies and by a commitment to long-term success.

The company's willingness to apply technology in key areas of its business led to its top rank among industrial and automotive manufacturers in the *Computerworld Premier 100* and its 17th rank overall. Timken's $35 million IS budget, which is more than 2% of total revenue, reflects management's reliance on automation.

"They are willing to build now for a very distant future," says Ronald Petrie, first vice-president at McDonald & Co., an investment brokerage in Cleveland. "Timken's emphasis on computers and automation stems from their long-term view."

That view is already paying off. The company's automated Faircrest plant, which went on-line in 1986, has drawn business away from its Japanese competitors' backyards: Nissan Motor Co., Mazda Motor Corp. and Mitsubishi Electric Corp. signed deals with the firm last year to buy roller bearings made with the new plant's higher quality steel.

The Faircrest plant is Timken's latest innovation in the manufacture of tapered roller bearings and specialty steel.

The products are used for such purposes as automotive transmissons, aircraft landing gear and oil pipelines. Ford Motor Corp., General Motors Corp., Deere & Co., Caterpillar, Inc. and aerospace firms are among Timken's largest customers.

The quality of the new plant's steel is so high that manufacturers of bearings have also signed on as customers.

Supervised by a vice-president of technology who also oversees product research and development, Peter Kost, director of corporate information systems, and Garry Fisher, general manager of computer-integrated business, run Timken's systems operations.

FROM THE START

Fisher, who now focuses on long-range technology planning, was responsible for both the engineering and IS aspects of Faircrest, which was built from the ground up.

The plant integrates process automation and business systems, with roughly 20 Digital Equipment Corp. VAX and PDP minicomputers and 40 Gould, Inc. programmable controllers running the entire steel-making process.

The systems interchange instructions with one of the company's four IBM mainframes at the main office over a Systems Network Architecture network.

Within the plant, the computers interchange data horizontally between processes and vertically to disseminate schedules and instructions

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across the shop floor. “We have measured improved productivity and cost reductions since the plant began operation,” Fisher says. “We are obtaining quality levels that we have never seen before.”

Traditionally, steel mills require seven man-hours of work to produce an ingot ton of steel. With computers running the processes, Faircrest produces an ingot using only two man-hours.

Producing better quality steel at a lower price gives Timken an edge over competitors. “It’s the equivalent of what the Japanese were doing to the auto industry — giving more car in a fuel-efficient package,” Petrie says. “Timken can give customers more bearing in a smaller, cheaper package because of computer-integrated manufacturing.”

But the biggest advantage is flexibility. The plant systems control the mixture of materials used in steel production, allowing each product to be designed to a customer’s specifications. These mixtures can be changed rapidly, allowing the firm to react quickly to changing market demands.

“Timken also gets a leg up on the competition by being able to improve the designs of products and change packages more quickly,” Petrie adds.

On the business side, Timken relies on a global network running IBM’s Professional Office System office automation software. Seventy-five percent of the work force uses electronic mail, and nearly all the top executives use workstations. The company’s nearly 12,000 personal computers and terminals reflect its commitment to providing broad access to IS capabilities.

In addition, electronic data interchange is an integral part of the company’s operations.

“We put a lot of effort into providing electronic data in whatever form the customers want it,” Kost says.

GETTING ALONG

Timken’s success can also be attributed to its human resources policies, which are reflected in amicable settlements with the steel union to increase efficiency. Like other manufacturers, Timken also wrestles with the traditional division between manufacturing engineers and IS personnel. There are about 400 IS staff members and roughly 400 engineers. Efforts to break down barriers are evident in the implementation of computer-aided software engineering on the IS side and joint plant development projects. Business units also have their own technical liaisons to implement IS projects.

“As a company we have a very collaborative style,” Kost says. “When engineers work with IS, both parties learn. At Faircrest, engineering learned a lot more about database and telecommunications, and the IS people learned more about machine-level interactions.”

As the managers look to the future, they hope to maintain the right mixture of advanced technology and staff management. “We think one of our keys to future success is to move aggressively in both of these areas,” Kost says. “We don’t think the companies that are only focusing heavily on technology are going to make it against the Japanese. We have to get the best of the people and ideas and back them with technology.”

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Industrial & Automotive Products

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1	**Timken Co.*** Canton, OH 17,400	17	27,120	$1,554	$66	$35
2	**Ingersoll-Rand Co.** Liberty Corner, NJ 29,900	56	25,145	$3,021	$162	$60
3	**Caterpillar, Inc.** East Peoria, IL 58,000	69	24,795	$10,255	$616	$200
4	**Borg-Warner Corp.*** Chicago, IL 70,200	70	24,760	$3,218	$419	$73
5	**Dover Corp.*** Memphis, TN 19,000	72	24,710	$1,954	$146	$44
6	**Black & Decker Corp.** Baltimore, MD 20,300	75	24,590	$2,374	$104	$125
7	**Mack Trucks, Inc.** Allentown, PA 9,400	91	24,135	$2,102	$25	$40
8	**Ford Motor Co.** Dearborn, MI 358,900	167	22,440	$92,446	$5,300	$1,610
9	**Deere & Co.** Moline, IL 38,100	193	21,830	$5,461	$268	$150
10	**Outboard Marine Corp.** Waukegan, IL 12,900	196	21,760	$1,653	$71	$18

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Union Texas Buyout Brings Focus on IS Business Value

By Connie Winkler

Four years ago, Union Texas Petroleum Corp.'s IS group was rocked by a leveraged buyout that took it out from under the wing of conglomerate Allied Chemical Corp. and placed it under the intense scrutiny of independent-minded management.

The buyout returned the Houston-based company to its roots as an independent oil and gas producer, changing the IS culture from "trying to do everything for everybody" to focusing systems projects on essential business needs, says MIS Director Richard L. White.

Management's concern about efficient, cost-effective IS operations extends down to the smallest acquisitions. White meets with the top five corporate officers each quarter to evaluate almost every IS decision, including the purchase of each personal computer — a category added to the agenda this year.

Jim Caldwell

MIS Director White *gets to the root of business needs*

Such a tight focus on matching IS projects with business requirements caused Union Texas to rank at the top of the petroleum and mining category in this year's *Computerworld Premier 100.* This new culture has sparked IS applications for day-to-day management and the exploration business itself.

"Union Texas is an aggressive user of highly specialized advanced workstations for simulating underground geology, thus pointing to where oil might likely be found," says Charles M. Strain, a securities analyst at Lovett Mitchell in Houston who has followed Union Texas for the last several years.

"In my mind, the key to their success has been oil discoveries offshore in the Gulf of Mexico, and those wells are directly tied to the use of workstations for seismic exploration," Strain adds.

Geologists in the company's Houston research groups use workstation-driven applications to identify the location of oil in new wells adjacent to existing ones in the North Sea. Because so-called edge or satellite wells are taxed differently by the UK, they return four to five times the amount of money as a separate new well.

Other significant applications:

- The company installed electronic monitoring devices at well sites, especially in remote parts of the Southwest. Data is downloaded into a handheld computer and then transmitted over phone lines to one of Union Texas' four U.S. regional offices.
- At its Karachi office, Union Texas is using a PC-based system to monitor the company's natural-gas contract with the Pakistan government. Because the new contract is so complex, it could not be managed manually, White says.
- Company lawyers in Houston use an internal electronic mail system based on IBM's Distributed Office Support System to receive daily court transcripts about their cases in foreign countries. One of the most notable cases was an explosion that killed workers at the Piper platform near Aberdeen, Scotland, in the North Sea last year.

Currently, Union Texas is installing a new internal communications network based on IBM's Systems Network Architecture and X.25 protocol. It replaces 10-year-old dial-up

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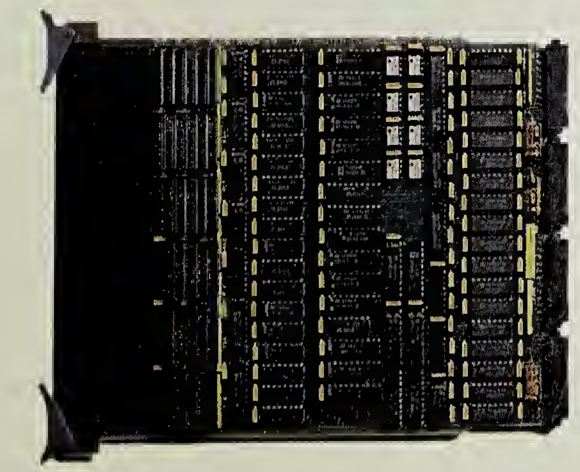

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connections in the regional offices and will also link corporate mainframes to departmental local-area networks, White says.

The company runs an IBM 3090 for business applications and two Digital Equipment Corp. VAXs and one Microvax at the research and development data center, all in Houston. Those processors are connected to about 750 IBM Personal Computers at Houston headquarters and 100 others worldwide.

In addition, the company recently installed IBM's DB2 database management system and its associated Application System (AS), which dramatically improved the ability to query existing systems. White describes bringing in AS and DB2 as rehabilitating existing systems, which added years to their lives.

NECESSARY QUERIES

The query capability was required because at the time of the buyout there was no time or money for new applications development, and management needed a wide variety of financial information. The information was available somewhere in the worldwide organization but not at headquarters, at least not in a timely fashion. A 16-page monthly financial report that senior managers had received was not only late but also did not present information relevant to the new lean-and-mean posture the company was assuming.

"We wanted tighter control over our expenses, and we couldn't close the books fast enough," recalls Robert L. Ryan, vice-president of finance. The newborn company did not have current revenue figures because overseas reporting lagged weeks or months behind. In addition, it had estimated revenue for the former parent company. The estimates were sometimes manually compiled from many different systems and PC spreadsheets.

"We didn't have time to rewrite any systems, so we began looking at [off-the-shelf] facilitating tools," White says. "With the [leveraged buyout], the needs didn't go away — the solutions changed."

Petroleum

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2	**Atlantic Richfield Co.** Los Angeles, CA 26,500	33	26,195	$17,626	$1,583	$257
3	**Unocal Corp.** Los Angeles, CA 18,200	49	25,440	$8,853	$480	$142
4	**Mobil Corp.** New York, NY 68,900	60	25,030	$48,198	$2,087	$670
5	**Amoco Corp.** Chicago, IL 50,100	61	24,990	$22,150	$2,063	$250
6	**American Petrofina, Inc.** Dallas, TX 3,200	144	23,040	$2,635	$133	$20
7	**Shell Oil Co.*** Houston, TX 32,432	153	22,830	$21,070	$1,239	$200
8	**Diamond Shamrock R&M** San Antonio, TX 3,700	158	22,710	$1,804	$54	$6
9	**Chevron Corp.*** Houston, TX 52,700	188	22,025	$25,196	$1,768	$171
10	**Sun Co., Inc.** Wayne, PA 22,000	216	21,195	$8,612	$7	$93

> *"Union Texas is an aggressive user of highly specialized advanced workstations for simulating underground geology, thus pointing to where oil might likely be found."*
>
> **— Charles M. Strain**
> **Lovett Mitchell**

A new five- to seven-page financial report was developed using IBM's AS. The report not only succinctly summarized each division's business, but it also flagged key issues and generally guided top management in steering the company away from its leveraged-buyout debt to its current earnings of more than $1 billion annually.

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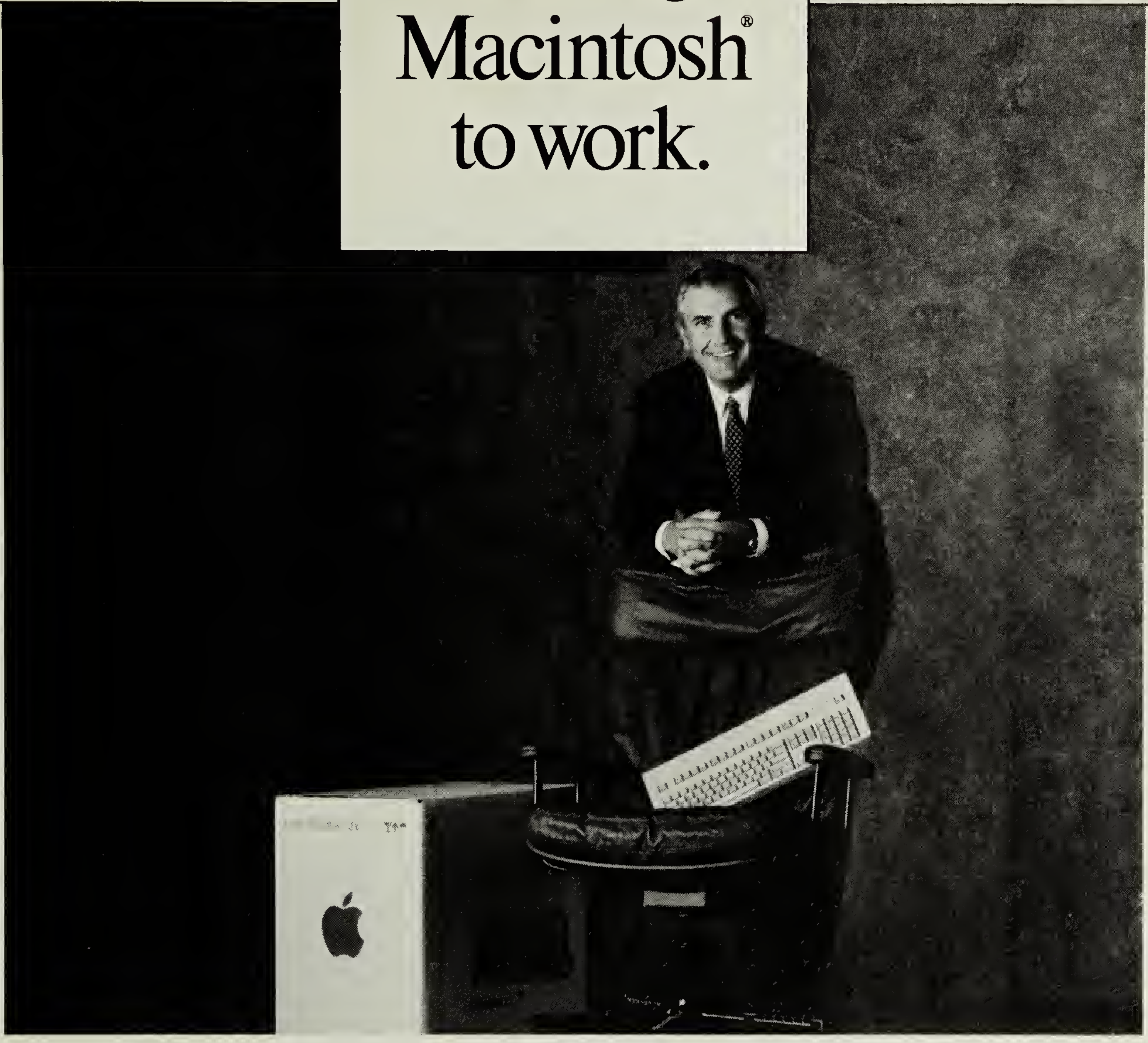

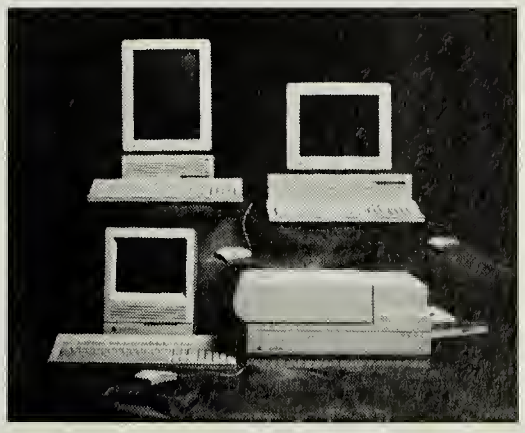

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Circle Reader Service Number 22

Pioneering Efforts Lead Abbott to Top for Second Consecutive Year

By Janet Fiderio

In the highly competitive pharmaceuticals and food industries, it is not easy to top the field in the use of information systems as ranked in the *Computerworld Premier 100.* Accomplishing that feat two years in a row is even more difficult.

Yet for the second consecutive year, Abbott Laboratories did just that. The company's success in IS is attributable to its commitment to technology in key areas:

- Reducing the time it takes to develop drugs, through computer-assisted molecular design (CAMD).
- Producing documents electronically to meet Food and Drug Administration requirements for new drug approval.
- Automating warehouses to reduce inventory and speed delivery time.

Abbott invests an estimated 2.5% of its annual revenue in IS — expected to grow from $4.9 billion to $5.5 billion this year — to support these efforts.

Because the pharmaceutical industry is so competitive, new technology plays an important role in Abbott's continued economic health. At the helm of the company's IS organization is Vice-President Kenneth Farmer. Farmer, who refused to be interviewed, reportedly manages a complex network of systems estimated to include two IBM 3090s, two 3084s, a raft of Digital Equipment Corp. minicomputers including four VAX clusters and a dozen Microvaxes.

For Abbott and other pharmaceutical firms, developing a new prescription drug is a long, expensive process and one that can benefit from the strategic use of technology. The financial rewards after FDA approval, however, can be very great. For example, according to Juan Noble, an analyst at Argus Research Corp. in New York, Abbott still brings in more than $300 million in sales each year from erythromycin, an antibiotic that dates back to the 1950s. With profits like these, new drugs become the lifeblood of the industry. Pharmaceutical firms have to keep coming up with new drugs to preserve their pricing flexibility, margins and earnings growth.

For this reason, the industry is scurrying to reduce the time it takes to develop new drugs. Anything that can be done to reduce that process, says Arthur D. Little, Inc. consultant Larry Chait, is considered an advantage.

Abbott uses CAMD, nuclear magnetic resonance machines and X-ray crystallography to help scientists develop drugs, says Jeff Newton, manager of pharmaceutical communications. This lets chemists address the causes and cures of diseases at a molecular level. Proprietary software and a viewing hood allow scientists to see three-dimensional

Patrick Pfister/Stock Boston

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At 3M, NOMAD's reputation for technical excellence is well-known. For the corporate data processing group, NOMAD is the recommended product for end-user computing. And as 3M's billion-dollar business sectors have installed their own mainframes, NOMAD has also been installed. NOMAD is currently used by four different groups within 3M.

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Circle Reader Service Number 23

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models of molecules on their computer screens, Newton says.

Abbott was one of the pioneers in computer-aided molecular design; today, many pharmaceutical companies use these techniques, according to industry analysts. Such technology, when combined with huge proprietary databases, reduces the vast number of chemicals that otherwise would have to be screened for effectiveness in new drug development. By doing so, the technology accelerates drug research and saves time for pharmaceutical companies.

Pharmaceuticals is a research- and data-intensive business. According to Chait, companies must create and maintain huge volumes of paper for the FDA. "There are literally truckloads of paper that have to be passed to the government," Chait says.

Some of the technologies under scrutiny that could help manage, access and store that information include expert systems and more flexible databases. Another technology getting a lot of attention is image systems using optical disks. Such media have obvious benefits. The 40,000 paper documents now needed by the FDA for a new drug application (NDA) would be accessed much easier via optical disk. Not only is information much more compact, Chait says, but if you build the table of contents and referencing schemes correctly, you can get at information much more quickly.

Pharmaceuticals & Food

COMPANIES ARE RANKED BY INDUSTRY ACCORDING TO CW 100 INDEX.
*ESTIMATES ARE FROM *COMPUTERWORLD* SOURCES, NOT THE COMPANY.

Industry rank	Company Location Total employees	Premier 100 rank	Total score	Total revenue (millions)	1988 profits (millions)	Estimated IS budget (millions)
1	**Abbott Laboratories*** North Chicago, IL 38,300	22	26,795	$4,937	$752	$125
2	**Sara Lee Corp.** Chicago, IL 89,100	26	26,535	$11,206	$377	$242
3	**Sipco, Inc.*** Hinsdale, IL 5,403	41	25,705	$3,225	$11	$31
4	**RJR Nabisco, Inc.*** Wilkes-Barre, PA 116,881	43	25,636	$16,956	$1,393	$240
5	**Johnson & Johnson*** New Brunswick, NJ 79,800	50	25,395	$9,000	$974	$200
6	**Merck & Co.*** Rahway, NJ 31,600	57	25,125	$5,940	$1,207	$150
7	**Schering-Plough Corp.*** Memphis, TN 22,100	88	24,180	$2,969	$390	$36
8	**Pfizer, Inc.** New York, NY 40,800	103	23,786	$5,385	$791	$125
9	**Smithkline Beecham*** Philadelphia, PA 38,900	122	23,405	$4,749	$229	$175
10	**The Coca-Cola Co.*** Atlanta, GA 18,100	136	23,175	$8,338	$1,045	$100

Although valuable for NDA filing, optical disks may also help firms simplify the task of finding isolated bits of information stored throughout huge distributed networks.

While optical disks were not available 1½ years ago, when Abbott broke new ground by sending an NDA to the FDA for approval in electronic form, Abbott representatives did the next best thing and negotiated the form of the application directly with the FDA. According to Newton, by sending an electronic application on disks, Abbott let the FDA format the data any way it wanted to and find what it was looking for much more easily.

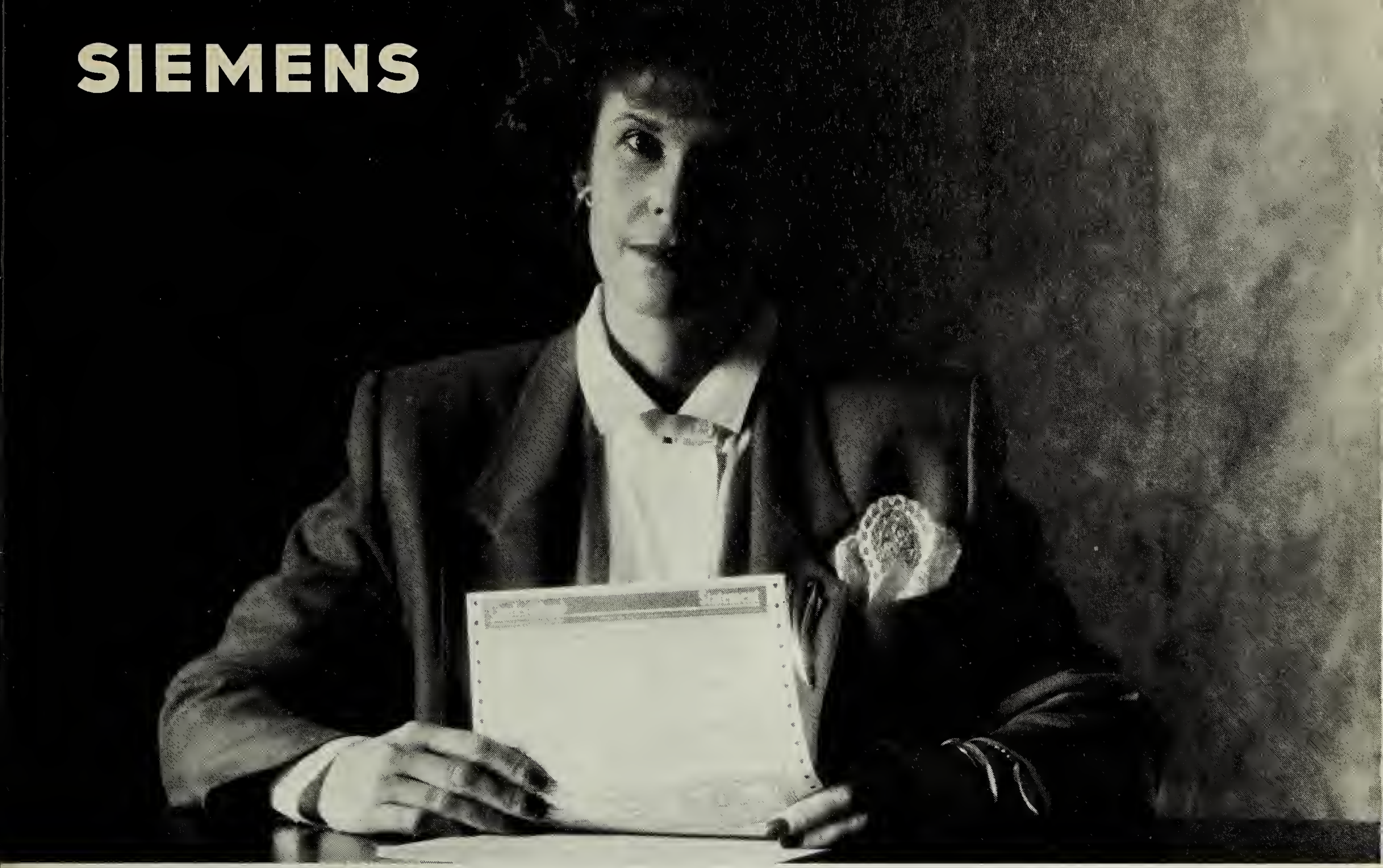
Today, representatives from several pharmaceutical firms work on a standard for electronic NDA filing through the computer-assisted new drug application review (CANDAR). CANDAR is working with the FDA on more efficient filing techniques. Once an Abbott drug is developed and has gone through the NDA approval process, computers are used to speed clinical trials.

In one clinical study for the blood-pressure drug Cartrol, 1,000 doctors recorded their observations of patients using the drug in a laptop computer provided by Abbott. Abbott will receive a disk from each doctor that will be downloaded into corporate IS systems for statistical analysis. Gathering and analyzing data this way avoids the delays and mistakes that come with rekeying.

Once a drug is on the market, the rush to get it delivered and distributed begins. Electronic data interchange (EDI) plays a major role in the way Abbott gets its products to consumers. Abbott's EDI distribution network, called Quicklink, is a microcomputer-based order-entry system that allows end users, usually hospitals or pharmacies, to order supplies with a number of vendors through one Quicklink connection.

FIDERIO IS A FREE-LANCE WRITER BASED IN GILSOM, N.H.

SIEMENS



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Circle Reader Service Number 24

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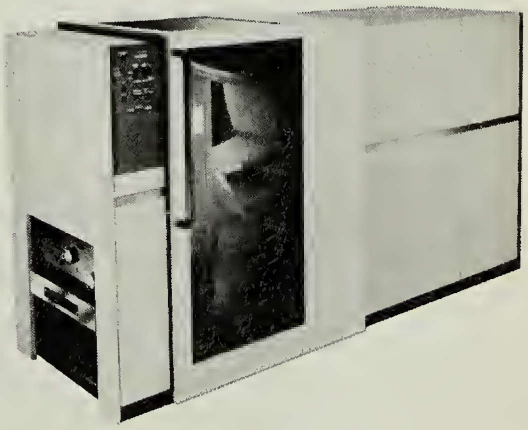

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Dun & Bradstreet Creates Advantage from Data Diversity

By Janet Mason

With 26 divisions running their own show, it's not surprising that Michael Field, Dun & Bradstreet Corp.'s top information systems executive and the man charged with getting them to work together, spends little time in his own office.

Field can be found at D&B's Wilton, Conn., location, its New York headquarters or one of the divisions, trying to bring technology advantages used in one area to bear on the needs of another.

"The challenge is to leverage the technology without interfering too much with the autonomy of the business divisions," Field says.

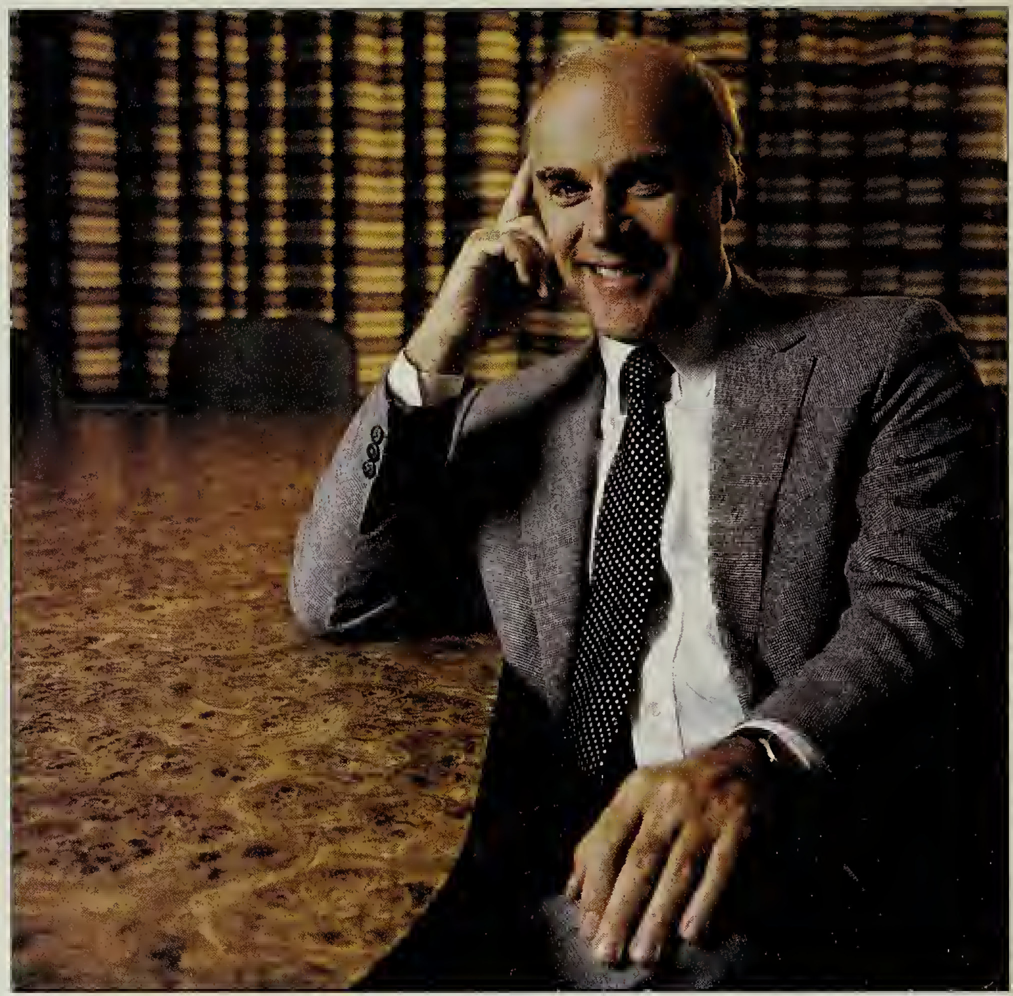
This delicate technology transfer is at the heart of Dun & Bradstreet's success in areas such as worldwide credit information services, including its Advanced Office System, which is distributed through an international packet-switched network called Dunsnet.

With products such as the credit rating service and the A. C. Nielsen Co. television viewing data, Dun & Bradstreet's IS support is applied directly to product delivery. About 90% of the company's IS expenditures, which total $200 million annually, finance development and maintenance of the information services that are sold to other companies.

D&B's effective use of technology ranks it at the top of the diversified services industry in this year's *Computerworld Premier 100.* The company has grown significantly since it began applying technology to its information services in the mid-1970s, expanding and broadening them and making them more flexible, says Ken Noble, a media analyst at securities firm Paine Webber, Inc. in New York.

"D&B's early reasons for computerizing were to reduce costs, increase efficiency and improve the quality of their information," Noble says.

Now that basic automation goals have been reached, Field is pursuing further technology transfer. A potential target is Worldview, a financial information service accessible with PCs via Dunsgate, an internal networking architecture whose technology might be transferred to marketing services, Field says.


Andy Freeberg

D&B's Field *uses technology to leverage the information services that his company provides*

Worldview lets users compare and analyze financial information in spreadsheet format from U.S. and European databases using graphs and charts, a concept that originated with Dun & Bradstreet's advanced development group.

THE GOOD HOST

In addition to meeting regularly with IS executives and senior managers of individual business units, Field hosts an annual meeting for about 75 such employees. He holds some clout in such sessions because he reports to the corporation's president; however, he says, he prefers to pursue a laissez-faire policy when practical rather than "play policeman."

D&B's nontechnical senior managers know more about technology than their counterparts at most other companies, Field contends, but in an industry where information is the lifeblood, they need to know more.

To teach the managers and raise their technological awareness, Field began a program in the past year in conjunction with human resources managers.

"Every two or three years, there are radically different investment options in technology," Field says. "We're holding this new training so that management can ask smarter questions about investment decisions."

At the sessions, information systems managers and senior managers from the divisions discuss the uses of technology.

"We found out that they haven't discussed things that we thought they would have brought up already because they considered it to be someone else's specialty," Field says.

Eventually, Field intends to extend the sessions to middle-level managers. "The business is more dependent on technology than ever," he says. "Now everyone needs to be involved." The more they do, he says, the more fruitful the efforts to leverage technology across business units.

As D&B continues to develop additional services, new technologies — especially PCs — are letting the company further customize information services, as with Worldview.

"There is now a greater opportunity to format the information in different ways and customize it to various segments of the market," Field says.

Dun & Bradstreet's ownership of Nielsen's marketing and media research division is prompting the company to emphasize the field of single-source marketing, Noble says.

> *"We have the challenge of changing a great deal of data into concise information products. We have to give the brand managers a composite view of what people are buying and reduce the amount of information so it is not overwhelming."*
>
> **— Michael Field**
> **Dun & Bradstreet**

These services are aimed at providing marketing managers with all the information tools they need to compete in the marketplace, such as data on television viewership, supermarket product movement, use of coupons and direct-mail demographics. "We have the challenge of changing a great deal of data into concise information products," Field says. "We have to give the brand managers a composite view of what people are buying and reduce the amount of information so it is not overwhelming."

Field says that he expects these services to become highly customized in the future. Someday, he says, customers will be able to combine their own internal databases with D&B's information services.

Diversified Services

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1	**Dun & Bradstreet Corp.** Berkeley Heights, NJ 65,500	44	25,635	$4,267	$499	$200
2	**Capital Cities/ABC, Inc.*** New York, NY 19,900	115	23,510	$4,773	$387	$60
3	**CBS, Inc.** New York, NY 7,500	117	23,505	$2,778	$1,153	$36
4	**The Walt Disney Co.** Burbank, CA 35,000	131	23,265	$3,747	$570	$80
5	**Hospital Corp. of America*** Nashville, TN 63,000	172	22,320	$4,111	$259	$70
6	**Alco Standard Corp.*** Valley Forge, PA 16,200	186	22,080	$3,871	$166	$87
7	**Sysco Corp.** Houston, TX 12,500	203	21,490	$5,561	$97	$41
8	**American Medical Int'l, Inc.** Los Angeles, CA 49,000	213	21,215	$3,017	$77	$67
9	**Waste Management, Inc.** Oakbrook, IL 33,700	251	20,185	$3,566	$464	$34
10	**ARA Holding Co.*** Philadelphia, PA 120,000	254	20,150	$3,917	$5	$88

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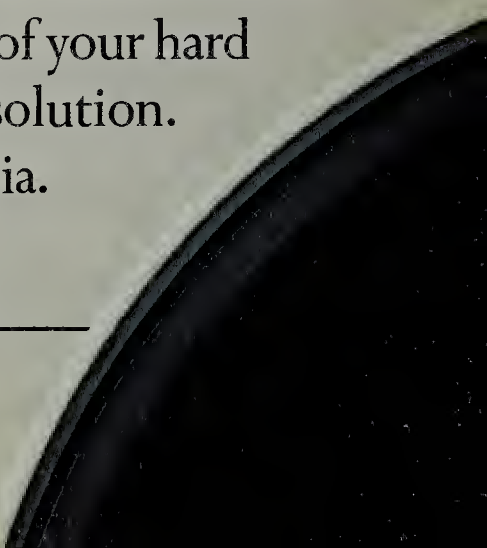

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Circle Reader Service Number 25

J. C. Penney Pursues the Ultimate System with Creative Applications

By Philip J. Gill

For more than 50 years, retailers have been chasing a single elusive goal — putting the right merchandise in the right place at the right time.

J. C. Penney Co. is no different from its competitors in pursuing this "ultimate system." But Penney's creativity in using information systems to reach this goal separates the company from its peers.

For example, Penney is working on a multimedia information system that will transmit images of products to customers across a satellite television network.

Customers will be able to use this electronic, interactive catalog to view images and hear an audio presentation at their local stores using personal computer workstations. Development work is currently being done on IBM Personal System/2s equipped with Micro Channel Architecture technology.

PATHWAY TO THE TOP

Such innovation, combined with the ability to accomplish the standard applications well, once again places Penney at the top of the retailing industry in the *Computerworld Premier 100.* "Information systems are increasingly important to the competitive posture of retailers," says Dave Evans, Penney's vice-president of systems and data processing.

"We can all get the same merchandise and be in the same malls. Even an information system in and of itself is not a competitive weapon — it's what you do with the information once you get it," he says.

In pursuit of the elusive ultimate system, J. C. Penney is continuing to extend its IS support in the following areas:

- The company is aggressively adding suppliers to its electronic data interchange (EDI) system, which is shifting from a proprietary to a standard environment.
- Penney is using bar-code tags on merchandise for automated data input to its IBM Systems Network Architecture (SNA) network for better inventory tracking and control.
- The retailer is implementing new management applications for sales and trends analysis using the bar-code data.
- It is installing image processing applications, including multimedia technology, and expanding the use of its private, satellite-based television network.
- Penney continues to use new application development tools, technologies and methodologies within its systems development.

Penney, which moved its headquarters from New York to Dallas last year, is switching its proprietary EDI format to the ANSI X12 standard. Before converting to the standard, the company could exchange data only with its largest suppliers — the ones that possessed sufficient resources to develop systems that could interface with the proprietary system.

Currently, Evans says, Penney exchanges information using EDI with about 500 suppliers, compared with 200 suppliers last year. Of those, 300 have already pledged to develop EDI interfaces based on the ANSI standard.

Standardizing will also allow improvements in the EDI system. With

Stan Wolenski

J. C. Penney's Evans *uses information aggressively as a strategic weapon*

"Computerworld Response Card Decks really opened doors to the 'heavy-hitter' accounts..."

Spectrum Concepts, Inc. is a 10-year-old software developer based in New York City. The company, which provides software and services to large corporations and financial institutions, recently developed XCOM 6.2, an LU 6.2-based software product that dramatically improves file transfer between different computing environments.

XCOM 6.2 eliminates the need for extensive custom programming when transferring data from one computer to another, including PCs, mainframes and minis. And it significantly lessens the amount of time necessary to complete connectivity projects.

Company president Alec Gindis was impressed with industry reaction after a news story announcing XCOM 6.2 appeared in *Computerworld.* So when Spectrum began implementing its marketing strategy for the new product, he considered *Computerworld* a key resource.

"Our goal was to generate sales leads from major organizations — Fortune 500 and Fortune 1000-type companies — that need to transfer files. We decided to use response card decks, and, based on the reaction we got to that product announcement, Computerworld's *was the card deck we thought of first.*

"And it's paid off; the results have been terrific. We've received hundreds of high-quality leads so far, and they're still coming in. In fact, Computerworld *Response Card Decks really opened doors to the 'heavy-hitter' accounts — major organizations that learned about us through the cards.*

"Now we've gotten to where we are recruiting additional account executives to follow up on the volume of these leads. Computerworld *Response Card Decks give us the best cost per lead of any medium. They also let us refine our marketing strategies through scientific 'split testing' — something other card decks don't always offer. We consider that a valuable bonus."*

— Alec Gindis
President
Spectrum Concepts, Inc.

Computerworld Response Card Decks give you a cost-effective way to reach a powerful buying audience of over 127,000 computer professionals. They're working for Spectrum Concepts, Inc. — and they can work for you. Call Norma Tamburrino, Account Manager, *Computerworld* Response Card Decks, at (201) 967-1350 to reserve your space today.

COMPUTERWORLD
RESPONSE CARD DECKS

Computerworld is an IDG Communications Newspaper the proprietary system, Penney could send and receive only summary information of each invoice, usually showing the total amount due. Using the ANSI standard is more flexible; it enables more suppliers to have line-by-line invoice descriptions. This will result in greater accuracy in inventory, Evans says.

YOUR ORDER IS READY

The EDI strategy also includes providing an on-line order status inquiry capability. "We can ask the system if an order shipped on June 12, and it will tell us it did or it didn't and supply us with a new date," Evans says.

Penney's SNA network is one of the largest in the U.S., supporting more than 100,000 terminals, including point-of-sale (POS) systems. Currently, the company is installing bar-code tags on all its merchandise. These tags will be read by optical character recognition (OCR) readers installed on every POS terminal and cash register in the firm's 1,400 stores.

A successful pilot program with Levi Strauss & Co. is moving ahead to a wholesale conversion of all merchandise.

"The bar code provides a faster transaction for our customers," Evans says.

Collecting the information, however, is just the first step. Then, using sales information that is fed into the network through bar-code tags and OCR readers, Penney's buyers and managers can work on several application systems that assist them in honing their merchandising strategy.

WERE SALES GOALS MET?

"Users will be able to pull information up on any terminal on the network," Evans says. For instance, buyers will be able to match real sales of a particular item by stock-keeping unit number against the sales plan for that particular item, to see whether it needs to be reordered and when.

Retailing

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1	**J.C. Penney Co.** Dallas, TX 185,500	55	25,155	$15,296	$807	$220
2	**Great Atlantic & Pacific Tea Co.*** Montvale, NJ 82,300	116	23,506	$10,068	$128	$101
3	**Sears, Roebuck & Co.** Chicago, IL 510,500	121	23,430	$50,251	$910	$775
4	**Federated Department Stores*** Norcross, GA 63,700	130	23,270	$4,542	$159	$200
5	**F.W. Woolworth Co.*** New York, NY 128,500	133	23,221	$8,088	$288	$81
6	**Melville Corp.*** Harrison, NY 93,500	147	22,965	$6,780	$355	$68
7	**Carter Hawley Hale Stores, Inc.*** Anaheim, CA 35,000	148	22,910	$2,708	$6	$40
8	**Winn-Dixie Stores, Inc.*** Ft. Lauderdale, FL 81,900	190	22,005	$9,088	$128	$91
9	**The May Department Stores Co.*** St. Louis, MO 147,500	214	21,210	$11,742	$534	$100
10	**K Mart Corp.** Troy, MI 342,500	215	21,200	$27,550	$803	$130

With the proprietary system, Penney could send and receive only summary information of each invoice, usually showing the total amount due. Using the ANSI standard is more flexible; it enables more suppliers to have line-by-line invoice descriptions.

The company's headquarters campus — where the new image application is being developed — is equipped with a 4M bit/sec. IBM Token-Ring network. This network, Evans explains, provides more than enough bandwidth to support image transmissions.

Within IS, Penney is also seeking to implement new tools, new technologies and new procedures that can be used to improve programmer productivity and shorten application development time. Chief among these new tools are intelligent workstations and relational database management systems.

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4	24	44	64	84	104	124	144	164	184
5	25	45	65	85	105	125	145	165	185
6	26	46	66	86	106	126	146	166	186
7	27	47	67	87	107	127	147	167	187
8	28	48	68	88	108	128	148	168	188
9	29	49	69	89	109	129	149	169	189
10	30	50	70	90	110	130	150	170	190
11	31	51	71	91	111	131	151	171	191
12	32	52	72	92	112	132	152	172	192
13	33	53	73	93	113	133	153	173	193
14	34	54	74	94	114	134	154	174	194
15	35	55	75	95	115	135	155	175	195
16	36	56	76	96	116	136	156	176	196
17	37	57	77	97	117	137	157	177	197
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11	31	51	71	91	111	131	151	171	191
12	32	52	72	92	112	132	152	172	192
13	33	53	73	93	113	133	153	173	193
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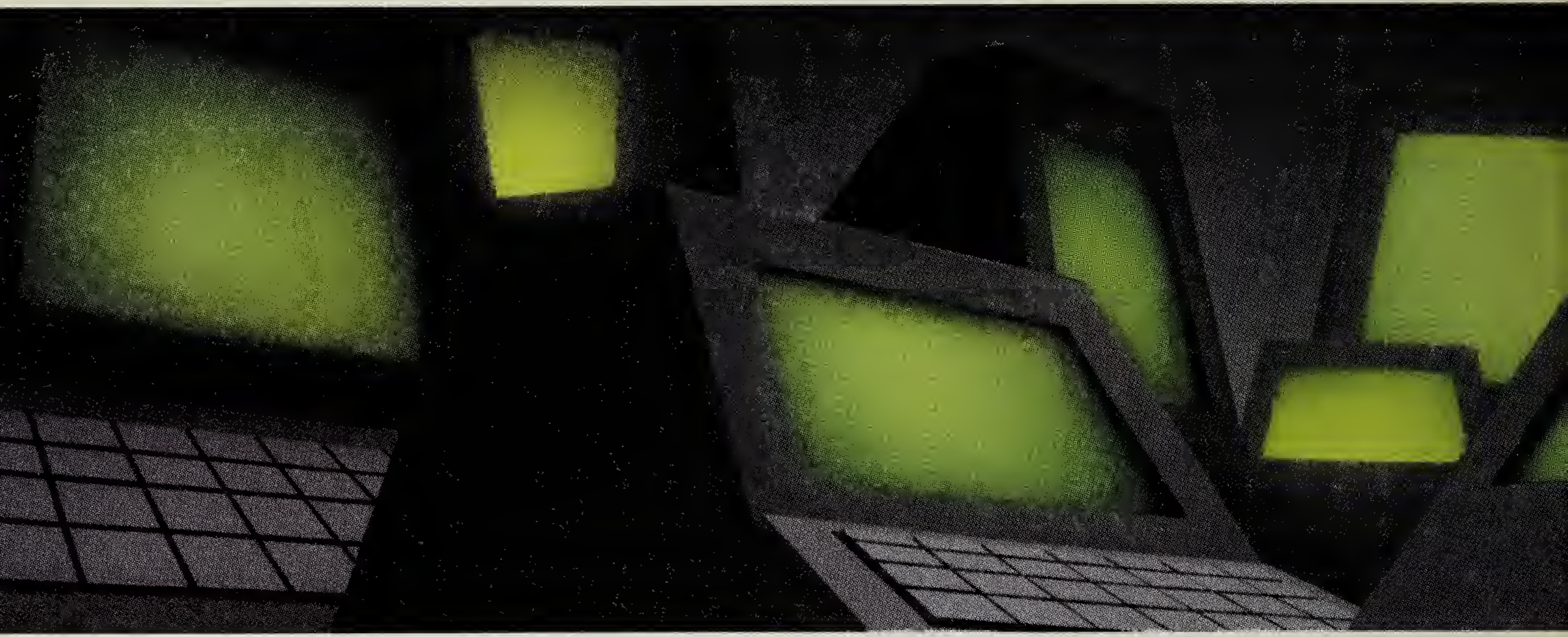

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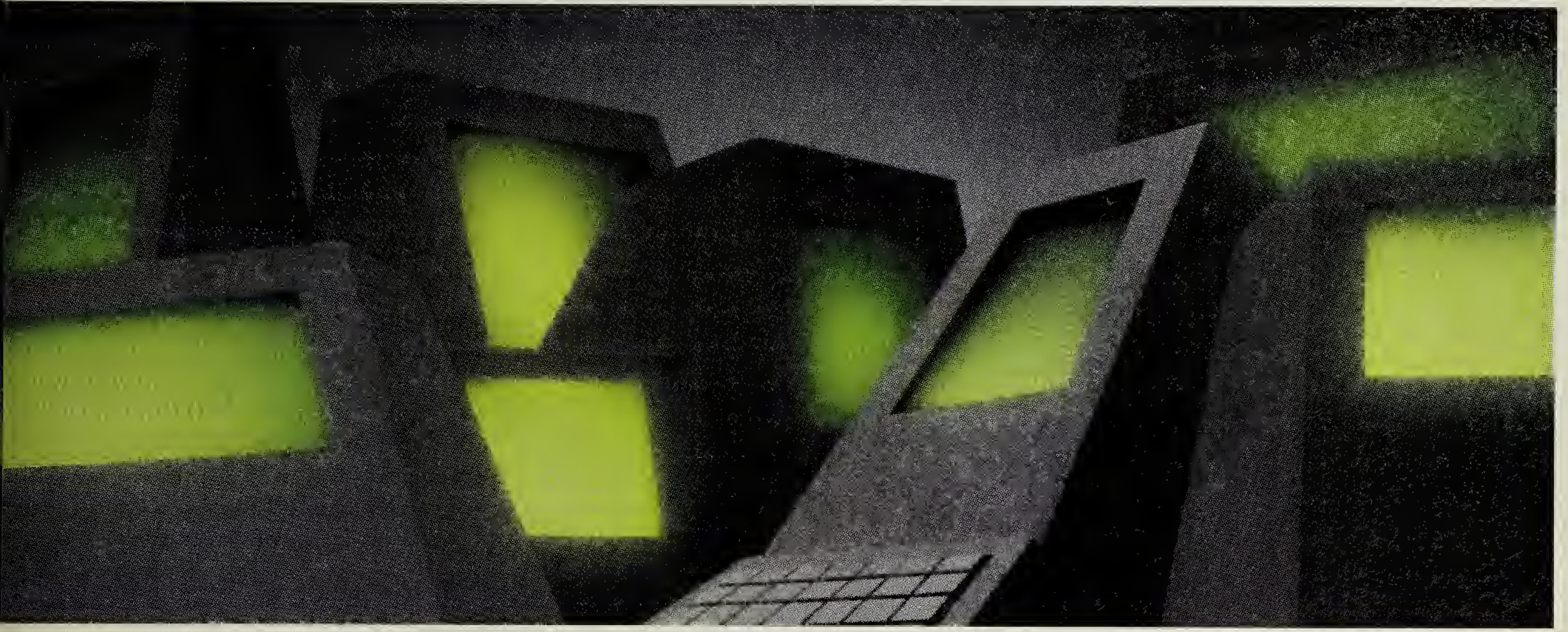

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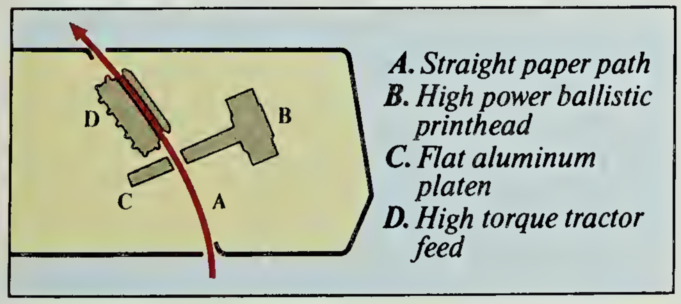
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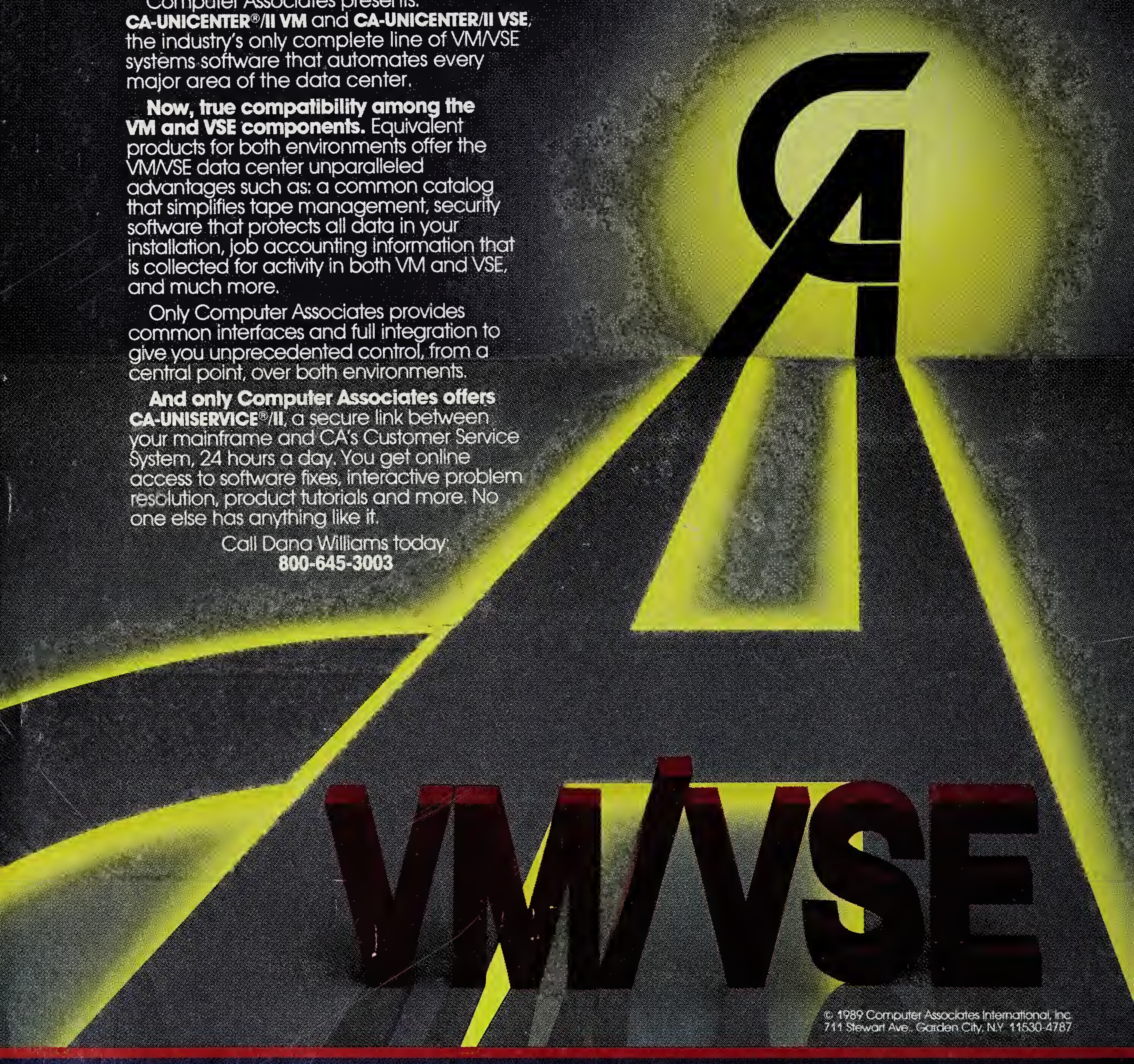

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